
March 2007



Final Environmental Assessment for Phase 8 of Military Family Housing, Mountain Home Air Force Base, Idaho

United States Air Force
Air Combat Command

Global Power for America

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**FINAL
ENVIRONMENTAL ASSESSMENT
FOR
PHASE 8 OF MILITARY FAMILY HOUSING
MOUNTAIN HOME AIR FORCE BASE
MOUNTAIN HOME, IDAHO**

CONTRACT NO.: FA-4897-05-M-9001

March 2007

Prepared for:

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ACRONYMS AND ABBREVIATIONS

ACRONYM/ ABBREVIATION	DEFINITION
ACC	Air Combat Command
ACHP	Advisory Council on Historic Preservation
ACM	asbestos containing materials
AFCEE	Air Force Center for Environmental Excellence
AQCR	Air Quality Control Region
BLM	Bureau of Land Management
BMPs	Best Management Practices
CAA	Clean Air Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO	carbon dioxide
dB	decibels
DNL	day-night average sound level
EA	Environmental Assessment
EIAP	Environmental Impact Analysis Process
EIS	Environmental Impact Statement
ERP	Environmental Restoration Program
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FHG	Family Housing Guide
FONSI	Finding of No Significant Impact
FY	fiscal year
HABS	Historic American Buildings Survey
HAP	Hazardous Air Pollutant
HQACC	Headquarters Air Combat Command
HUD	Housing and Urban Development
IDEQ	Idaho Department of Environmental Quality
in.	inch
INRMP	Integrated Natural Resources Management Plan
JNCO	Junior Non-Commissioned Officer
LBP	lead-based paint
MHAFB	Mountain Home Air Force Base
MFH	Military Family Housing
MGD	million gallons per day
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
NO ₂	nitrogen dioxide



ACRONYMS AND ABBREVIATIONS

ACRONYM/ ABBREVIATION	DEFINITION
NO _x	nitrogen oxide
NPL	National Priority List
O ₃	ozone
o.c.	on center
Pb	lead
PM _{2.5}	particulate matter with an aerodynamic radius equal to or less than 2.5 microns
PM ₁₀	particulate matter with an aerodynamic radius equal to or less than 10 microns and greater than 2.5 microns
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SO ₂	sulfur dioxide
USAF	United States Air Force
USEPA	United States Environmental Protection Agency
USTs	underground storage tanks
VOC	volatile organic compounds



FINDING OF NO SIGNIFICANT IMPACT

Final Environmental Assessment for Phase 8 of Military Family Housing Mountain Home Air Force Base, Mountain Home, Idaho

I. NAME OF ACTION

Phase 8 of Military Family Housing (MFH) for Mountain Home Air Force Base (MHAFB), Mountain Home, Idaho.

II. DESCRIPTION OF ACTION

Proposed Action: The Proposed Action is to implement Phase 8 of MFH at MHAFB. The Proposed Action would demolish all 439 existing housing units in the Phase 8 area because they do not meet current USAF housing standards or they are structurally deteriorated beyond economical repair, and replace them with 457 modern housing units. Three of the 439 existing housing units are eligible for the National Register of Historic Places (NRHP) and have been deemed important on a state and national level by the Idaho State Historic Preservation Officer (SHPO). These three housing units are the General's house, the Commander's house, and the Colonel's house. Each of these Senior Officers' Quarters are individually eligible for the NRHP.

Alternative Actions: Three Alternative Actions to the Proposed Action for the Senior Officers' Quarters were developed and considered.

Alternative 1 – Visitor Welcome Center at Front Gate. This action would consist of moving one of the three Senior Officers' Quarters to MHAFB's front gate area. The open floor plan of each of the three houses lends itself to use as a visitor welcome center, a function that is currently lacking at MHAFB.

Alternative 2 – Office and Laboratory Space at Heritage Park. This action would consist of moving one of the three Senior Officers' Quarters to the Airplane Display section of Heritage Park. The layout of the interior space within each of the houses is amenable to use as an office and archeological laboratory and research space, a function that is currently lacking at MHAFB.

Alternative 3 – Donate. If a new owner were found who was willing to accept the expense of moving one or more of the structures, this alternative provides for the opportunity to preserve one or all of the houses, albeit outside the historic context of MHAFB.

No Action Alternative: The No Action Alternative for Phase 8 MFH is three-fold: the 436 standard housing units would not be demolished, the three Senior Officers' Quarters would not be demolished, and the 457 housing units would not be constructed. Under the No Action Alternative, military personnel would continue to live in housing units that do not meet current USAF housing standards or are structurally deteriorated beyond repair, the United States Air Force's philosophy of whole-house/whole-neighborhood would not be implemented at MHAFB, and the 436 standard housing units and the three Senior Officers' Quarters would continue to need regular maintenance and repair, resulting in the disruption of USAF personnel and their families. Because the quality and sustainability of MFH at MHAFB would degrade, compromising the military mission of MHAFB, the No Action Alternative would not satisfy the purpose and need of the Proposed Action.

III. ANTICIPATED ENVIRONMENTAL EFFECTS

The principle environmental impact related to the implementation of the Proposed Action would be the demolition of the three Senior Officers' Quarters. The Proposed Action would result in the loss of significant historic resources on a state and national level. Demolition would require a full consultation process with SHPO, as required by Section 106 of the National Historic Preservation Act (NHPA) of 1966.

The other anticipated environmental effects would be minor, short-term, unavoidable negative impacts. These include temporary disturbance to soils, vegetation, and common wildlife species during construction activities. Noise and air resource impacts would be limited to the duration of active construction activities. Additionally, there would be minor permanent impacts to resources such as landfill capacity and water consumption/wastewater production.

IV. MITIGATION MEASURES

SHPO would require a Historic American Buildings Survey (HABS) before the structures were demolished. The HABS process is designed to produce high quality documentation of a building prior to demolition. HABS documentation would record the houses, their construction, and their setting.

HABS is a labor intensive process accomplished at three levels of recordation. Although all three levels are not necessarily required on every project, all three levels would likely be required by the SHPO and the National Park Service for each of the Senior Officers' Quarters because each structure is significant on a state and national level.

For the three Senior Officers' Quarters, the first level HABS would include a written historical report comprised of primary and secondary resources, such as

oral histories of previous occupants, written histories of MHAFB, construction and maintenance records, and legal information. The second level of documentation would include black and white, large format photographs derived from 4 x 5 or 8 x 10 inch negatives of each of the three buildings. The photographs would be archivally stable, perspective corrective, high quality prints. The third level of documentation would involve on-site recordation of each of the three buildings, including all exterior and interior aspects and important details.

Several other mitigation measures would be implemented to minimize minor potential impacts to environmental resources as a result of the Proposed Action for the standard housing units. These mitigation measures include soil and water conservation measures, pre-construction monitoring for special concern species, habitat restoration, and air quality controls. These mitigation measures would be implemented under the direction and guidance of MHAFB's Integrated Management Plan where specific conservation, restoration and mitigation initiatives are outlined for long-term management of the MHAFB.

V. CONCLUSIONS

Based on the analysis presented in this EA and summarized above, it is not anticipated that any significant impacts would occur as a result of implementing the Proposed Action. Although each of the Senior Officers' Quarters are eligible for listing with the NRHP, and are thus considered significant historic resources per the NHPA, the demolition of the structures after completion of the required Section 106 consultation process with the Idaho SHPO does not elevate the impacts to the level of significant per the National Environmental Policy Act (NEPA) of 1969. Therefore, an environmental impact statement is not necessary. This analysis fulfills the requirements of NEPA and the associated Council on Environmental Quality regulations, as well as the requirements of the Environmental Impact Analysis Process for the USAF as described in 32 CFR Part 989.



CHRIS R. CHAMBLISS, Colonel, USAF
Vice Commander

5 March 2007

Date

1.0 INTRODUCTION

1.1 BACKGROUND

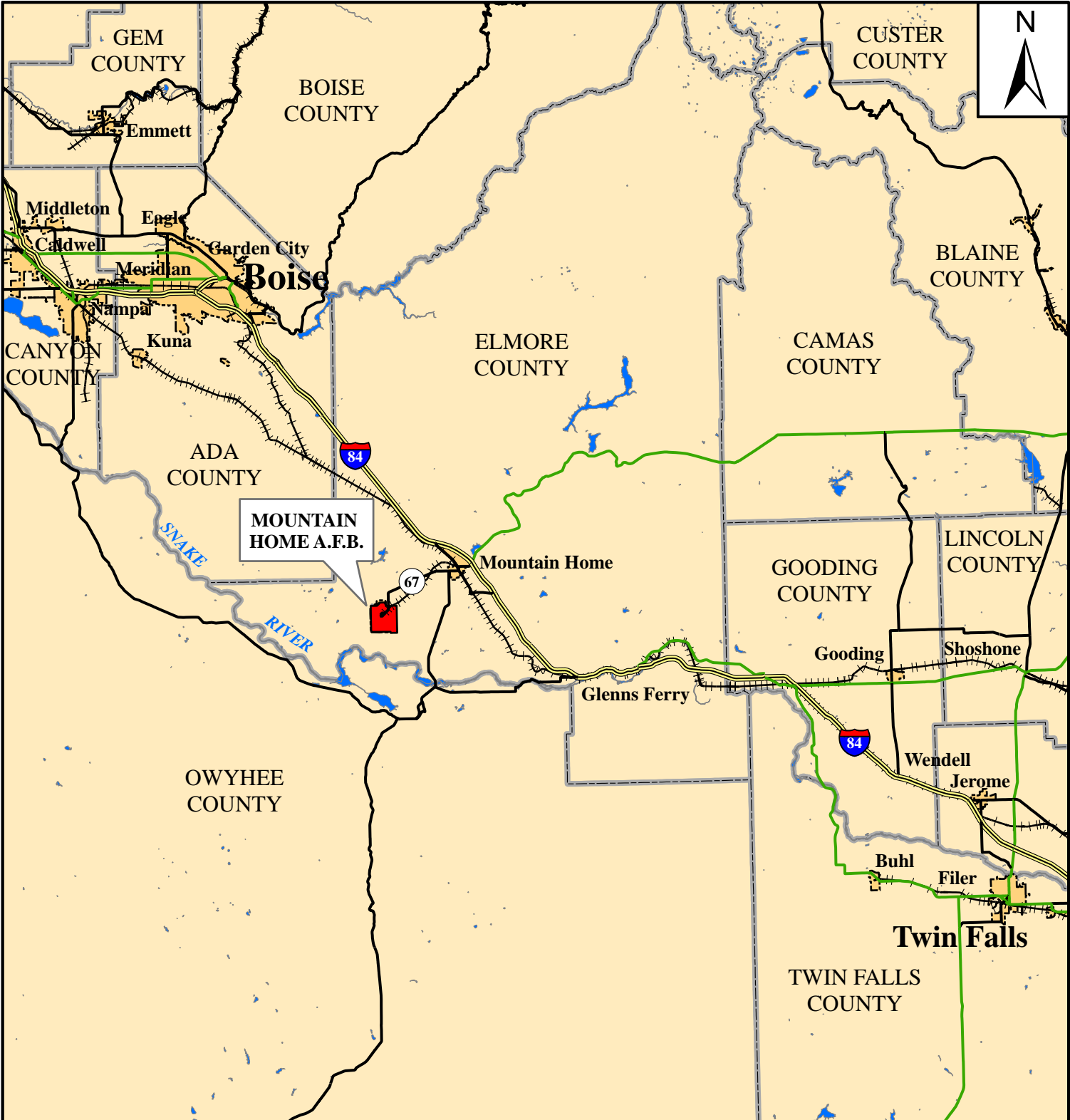
The Mountain Home Air Force Base (MHAFB) is located in southwestern Idaho, approximately 50 miles southeast of Boise and 8 miles southwest of Mountain Home (Figure 1). MHAFB covers 6,844 acres and is home to the Air Combat Command's (ACC) 366th Fighter Wing (366th FW), which is comprised of more than 4,400 personnel (CH2MHILL 2004). Members of the 366th FW and their families rely on numerous community support services provided by MHAFB. One such primary community support service is military family housing (MFH).

The purpose of the new housing on MHAFB is to create for Air Force families a variety of dynamic, livable communities that have a strong sense of neighborhood identity. One of the primary goals outlined in the 2005 Mountain Home Master Plan is to create organized, traditional neighborhoods that combine strong neighborhood identities with direct accessibility and interconnectivity among neighborhoods. In addition to providing pedestrian trails connecting all neighborhoods and the shared recreational areas within those neighborhoods, the Master Plan lays out a street design that reinforces the idea of small neighborhood clusters.

The neighborhood design and open space configurations described in the 2005 Mountain Home Master Plan (MHAFB 2005) reflect the “whole-house/whole-neighborhood” philosophy of the United States Air Force (USAF) *Family Housing Guide* (FHG) (USAF 2004). One of the goals of the USAF FHG is to design neighborhoods that are pedestrian friendly and encourage social interaction so that these communities become desirable places to live and foster a sense of home. The whole-house/whole-neighborhood philosophy emphasizes the deliberate and integrated use of open space areas outside of the realm of individual housing units. As reflected in the 2005 Mountain Home Master Plan, open space areas are dedicated to community amenities such as playgrounds, trails, and landscaping. Another key goal of the USAF FHG is to create housing units, either through improvement or replacement, that meet contemporary housing standards in terms of housing codes, functionality, and amenities.

In recognition of the importance of MFH on MHAFB, housing units that are not in compliance with current USAF housing standards, or housing units that are structurally deteriorated beyond economical repair, are being demolished. These housing units are being replaced with new housing units that meet the USAF space and quality standards, and are laid out in appealing and functional neighborhood designs. For budgetary and building contractor availability reasons, and to minimize the level of disruption on the base, Headquarters Air Combat Command (HQ ACC) has proposed, and MHAFB is implementing, a phased approach to the replacement of existing MFH with new housing units. This environmental assessment (EA) covers Phase 8 of MFH on MHAFB.





Project Location

SCALE

10 5 0 10 20 30

Miles

LEGEND

	Mountain Home AFB		Interstate Highway
	Urban Area		U.S. Route
	County		State Route
	Water Feature		Rail Line

Figure 1. Location of the Mountain Home Air Force Base Phase 8 EA, Elmore County, Idaho.

Prepared For:

Prepared By:

Date: 9/06

Source: Digital Data Layers Provided From the Interactive Numeric & Spatial Information Data Engine www.InsidelIdaho.org

1.2 PURPOSE AND NEED

The number of military personnel stationed at MHAFB is almost 4,500. As guaranteed to all members of the USAF, personnel of the 366th FW are provided living quarters either on MHAFB or in a nearby off base location. The most recent housing market analysis determined that within MHAFB's housing market area, defined as a 30-minute commute time from the installation's headquarters building during peak traffic, there is a private sector housing deficit for military families (USAF ACC 2003a).

The current inventory of housing units on MHAFB is 1,525 units (MHAFB 2005). The most recent housing requirements and housing market data indicates that the 1,525 housing units include a surplus of 286 units (MHAFB 2005). HQ ACC has determined that 85 of the estimated 286 surplus units be included in the final requirement total, so that the number of housing units being built as part of MHAFB's Master Plan is 1,324 units. Of this total number, 457 housing units would be constructed during Phase 8 of MFH.

Within the base, the existing MFH is aging and increasingly expensive to maintain (MHAFB 2005). In addition, there are lead based paint (LBP) and asbestos-containing material (ACM) hazards in all of the housing units in Desert Vista, Dunes, and Gunfighter Manor (AFCEE 1999).

The existing Desert Vista units are single-family residences that consist of single story, three bedroom, one and a half bath (some units have two full baths). These units were constructed in 1969 and had a whole house renovation in approximately 1992. The units utilize "modular" framing and are installed on permanent foundations. Small, single vehicle carports have been added to the original structures.

The existing Dunes community consists of various styles of four residence multi-plex housing units. These include the one story, two-bedroom, one bath N2B type; the two-story, three bedroom, one and a half bath N3B type; and, the two-story, four bedroom, two and a half bath N4B type. A single vehicle carport has been attached to each residence. All of the Dunes housing units were constructed in 1971 and have never had a whole house renovation. Deficiencies in the N3B type units include undersized bedrooms and total living space and lack of interior and exterior storage.

The existing GC3 housing units in Gunfighter Manor are single-story duplex units that contain two three-bedroom and one and three quarter bath residences. These units were constructed in 1962 and have never had a whole house renovation.

1.3 SENIOR OFFICERS' QUARTERS

Of the 439 housing units that are slated for demolition, three of the ones in Gunfighter Manor are eligible for the National Register of Historic Places (NRHP) and have been deemed significant on a state and national level by the Idaho State Historic Preservation Officer (SHPO). These three housing units are the General's house, the Commander's house, and the Colonel's house. Each of these Senior Officers' Quarters are individually eligible for the NRHP, and represent



Capehart Housing designed by a collaboration between two architectural firms: Hummel, Hummel, and Jones and Neutra and Alexander.

In particular, Richard J. Neutra of the firm Neutra and Alexander Architects is an internationally recognized architect. The Gunfighter Manor neighborhood and the Senior Officers' Quarters were designed as a collaborative effort between the two architectural firms in 1955 and constructed on the base in 1959. The three Senior Officers' Quarters contain many hallmarks of the International Style, for which Richard Neutra is internationally recognized. The three Senior Officers' Quarters are both the only examples of Neutra's work in Idaho and the only remaining Neutra structures in the USAF. As with the other 436 existing housing units, the Proposed Action for the three Senior Officers' Quarters is demolition with appropriate mitigation measures. Unlike the other 436 housing units, there are three alternatives to the Proposed Action for the three Senior Officers' Quarters (Section 2.0).

1.4 SCOPE

This EA evaluates potential environmental impacts associated with the activities of Phase 8 MFH on MHAFB. Potential environmental impacts associated with the implementation of previous MFH phases on MHAFB have been considered in previous EAs. The National Environmental Policy Act (NEPA) of 1969 requires Federal agencies that fund, support, permit, or implement major programs and activities to take into consideration in the decision-making process the environmental consequences of Proposed Actions (NEPA, Title 42, United States Code, Section 4321 *et seq.* [42 United States Code 4321 *et seq.*]). The intent of NEPA is to promote efforts that would prevent or eliminate damage to the natural and cultural environment. The Council on Environmental Quality (CEQ) was established under NEPA to implement and oversee Federal policy in this process.

The CEQ issued regulations implementing the process in Title 40, Code of Federal Regulations (CFR), Parts 1500-1508 (40 CFR 1500-1508). Per these regulations, an EA should succinctly and completely provide the necessary data and analysis to determine whether a Proposed Action would have significant effects on the natural and cultural environment. If the analysis indicates that the environmental impacts would not be significant, based on the context and intensity of the effect, a Finding of No Significant Impact (FONSI) is prepared. If the analysis indicates that negative environmental impacts are potentially significant, the EA becomes the groundwork for the preparation of a more in-depth, comprehensive environmental impact statement (EIS).

The intent of this EA is to ensure NEPA compliance for Phase 8 of MFH on MHAFB. By assessing the details of the location, size, and extent of Phase 8 MFH, and using existing information on the ecological and built environment of MHAFB, the analyses in this EA form the basis for determining the significance of the environmental impacts associated with Phase 8. It is important to note that although the Senior Officers' Quarters are eligible for listing on the NRHP and are therefore considered significant historical resources, the term "significant" as used in the context of NRHP is different than "significant" as used in the context of NEPA. Significant effects for the purposes of NEPA are effects that, even with mitigation, surpass a context and intensity impact threshold.



This EA conforms to the Environmental Impact Analysis Process (EIAP) for the USAF as described in 32 CFR Part 989. The EIAP describes USAF procedures for conducting and preparing environmental assessments. Based on guidance for conducting the USAF's EIAP (32 CFR Part 989), categorical exclusions are appropriate for categories of actions that do not individually or cumulatively have potential for a significant effect on the environment and do not, therefore, require further environmental analysis in an EA or an EIS. Characteristics of such categories of actions are minimal adverse effects on environmental quality, no significant change to existing environmental conditions, and no significant cumulative environmental impact.

In addition, Appendix B of 32 CFR 989 specifically lists actions that are categorically excluded in the absence of unique circumstances. Actions that would ordinarily fall into one of the categorically excluded actions may be routine actions that have unique circumstances present within the project footprint. Examples of unique circumstances include: actions of greater scope or size than generally experienced for a particular category of action; or presence of threatened or endangered species, archaeological remains, historic sites, or other protected resources. Phases 2 and 3 of MFH were analyzed in an EA that resulted in a FONSI (Air Force Center for Environmental Excellence [AFCEE] 1999). Phase 8 could have been categorically excluded from further analysis if not for two factors: the size and scope of Phase 8 is greater than all previous phases of MFH, and there are eligible historic properties within the footprint of the Phase 8 project.

1.5 STRUCTURE

This EA is divided into eight sections. Section 2 presents a description of the Proposed Action and Alternative Actions. Section 3 presents information on the current conditions of the affected environment. Section 4 provides a description of environmental consequences for the Proposed Action and Alternative Actions. Section 5 provides a summary and conclusions, followed by a list of references in Section 7, and a list of preparers in Section 8.



2.0 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

The Proposed Action is to implement Phase 8 of MFH at MHAFFB. The Proposed Action would demolish all the existing housing units in the Phase 8 demolition area (Figure 2), including the Senior Officers' Quarters, and replace them with modern housing units in the Phase 8 construction area (Figure 2). Section 2.1 describes this Proposed Action for the 436 standard housing units and the three Senior Officers' Quarters that are eligible for the NRHP. Section 2.2 describes three alternatives to demolition for the Senior Officers' Quarters. Section 2.3 describes the No Action Alternative.

2.1 PROPOSED ACTION

This section describes the Proposed Action for the existing 436 standard housing units and the three Senior Officers' Quarters eligible for the NRHP. The Proposed Action would satisfy the purpose and need of Phase 8 of MFH at MHAFFB.

2.1.1 Standard Housing Units

The Proposed Action for the 436 standard housing units of Phase 8 that are not eligible for the NRHP is to demolish all 436 of the units because they do not meet current USAF housing standards or they are structurally deteriorated beyond economical repair. In their place, the Proposed Action would construct 457 housing units that meet current USAF standards for military family housing. The following sections describe the details of these three areas of activity as they are described in MHAFFB's 2005 Master Plan. Modifications to neighborhood layouts and architectural styles could occur as planning for MFH progresses.

Demolition

Figure 2 shows the locations of the standard housing units that would be demolished in Phase 8. As currently planned, Phase 8 demolition activities would occur in the existing housing neighborhoods of the Dunes, Desert Vista, and Gunfighter Manor. In addition, four standard housing units would be demolished in the southeastern portion of the Eagle View neighborhood.

The contractor hired to conduct the demolition activities would be required to completely remove all aspects of the housing units, including the units themselves, associated garages, foundations, and driveways up to the sidewalk boundary. After removal of all of the resulting demolition material, each housing unit footprint would be leveled. The contractor would be directed to minimize to the fullest extent possible the injury and destruction of existing vegetation. Conservation of as many large trees as possible is a goal for MHAFFB.

The contractor would be responsible for conducting all demolition, removal, and disposal activities in accordance with applicable local, state, and Federal laws and regulations. The contractor would ensure that all specifications related to ACM and LBP removal and disposal are followed.



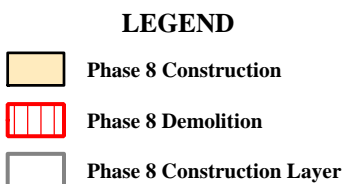
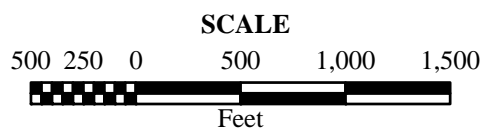
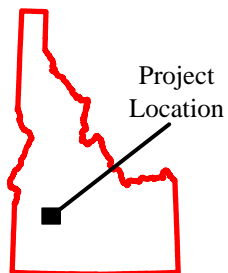


Figure 2. Demolition & Construction Areas for the Mountain Home Air Force Base Phase 8 EA, Elmore County, Idaho.

Prepared For:



Prepared By:



Date:
9/06

Source: USDA-FSA-APFO Aerial Photography Field Office
1 Meter Resolution 2004
Digital Data Layers Provided by the Mountain Home AFB/Geo
Integration Office & Northern Ecological Associates, Inc.

The contractor would ensure that all on-site utilities are handled in accordance with MHAFFB's 2005 Master Plan. As delineated in the 2005 Master Plan and in the contractor's scope of services, water, sewer, electric, and gas lines would be either capped or removed, with capping occurring as close to existing mainlines as possible. In the event that some sections of utilities would be maintained for customers further down the delivery system, any service interruptions would be coordinated with the base in advance.

Construction

Figure 2 shows the Phase 8 construction area. As shown in MHAFFB's 2005 Master Plan, Phase 8 construction activities would create new neighborhood designations: the Dunes, Greenbrier, Sherwood, and Desert Pines. Specifically, Phase 8 includes the construction of: 281 two plus-bedroom junior non-commissioned officer (JNCO) units, 98 three-bedroom JNCO units, and 78 four-bedroom JNCO units. Of the total units constructed in Phase 8, 386 would be of a duplex housing type and 71 would be of a single housing type. Phase 8 has a density of 4.42 housing units per acre, and all of the units are for enlisted officers (MHAFFB 2005). This housing density is within maximum standards allowed by the 2004 USAF FHG (USAF 2004). At the completion of Phase 8, two-thirds of the area would be housing and one-third would be open space.

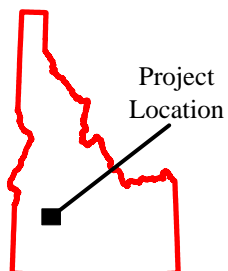
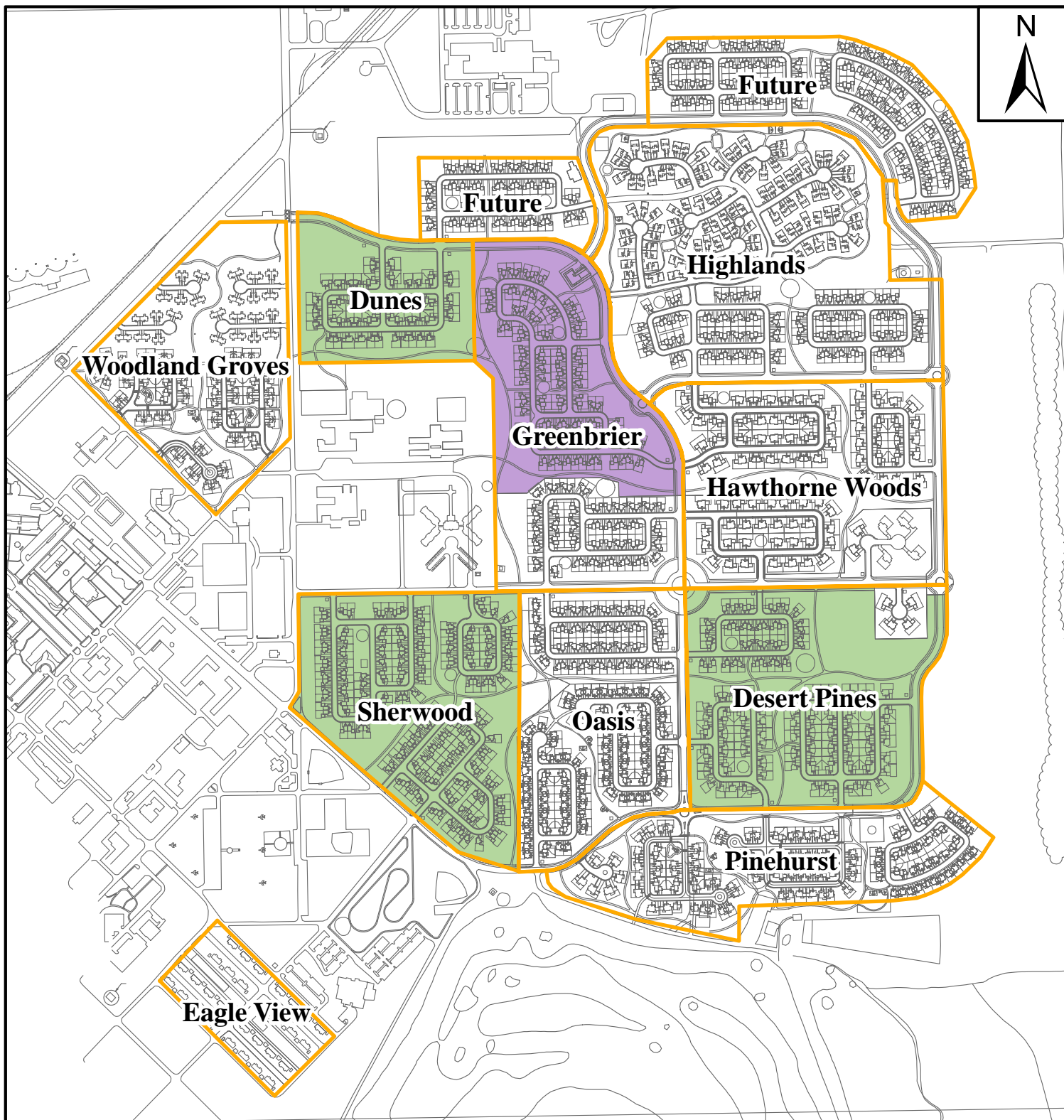
Housing units constructed in the Dunes, Sherwood, and Desert Pines neighborhoods are shown in MHAFFB's 2005 Master Plan as Georgian/Box style (Figure 3). Architectural characteristics associated with the Georgian/Box style include: low profile pyramidal roofs; a regular box plan that is predominately symmetrical; a central hipped dormer that emphasizes the symmetry; and wide bracketed cornices. Garages are downplayed and located to the rear, and the houses themselves are located in close proximity to the sidewalk (15-foot setback). Exterior materials used in the Georgian/Box style include a brick veneer wainscot base with hardi-plank siding above (MHAFFB 2005).



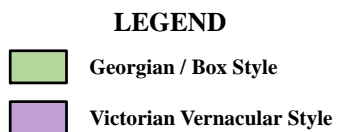
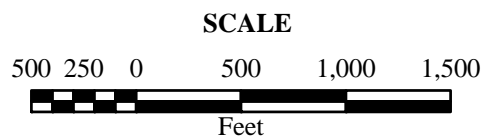
Artists rendering of examples of Georgian/Box style housing units (MHAFFB 2005).

As currently planned, housing units constructed in the Greenbrier neighborhood would be of a Victorian Vernacular style (Figure 3). Architectural characteristics associated with the Victorian Vernacular style include: high pitched gable roofs; asymmetrical porch and tower elements; arched windows and projecting bays; porch projections with pedimental roofs;





Project
Location



**Figure 3. Neighborhoods & Building Design Styles
for the Mountain Home Air Force Base
Phase 8 EA, Elmore County, Idaho.**

Prepared
For:



Prepared
By:



Date:
9/06

Source:
Digital Data Layers Provided by the Mountain Home AFB/Geo
Integration Office & Northern Ecological Associates, Inc.

and a variety of window styles. As with the Georgian/Box style, garages are downplayed and located to the rear, and the houses themselves are located in close proximity to the sidewalk (15-foot setback). The primary exterior material used in the Victorian Vernacular style is hardiplank multi-colored siding (MHAFB 2005).



Artists rendering of examples of Victorian Vernacular housing units (MHAFB 2005).

The new configuration of neighborhoods and streets detailed in the 2005 Mountain Home Master Plan reflects the USAF's whole-house/whole-neighborhood philosophy (USAF 2004). Construction of these neighborhoods and streets, and the accompanying utility infrastructure and open space areas, would proceed in line with the guidelines and procedures described in the USAF FHG.

2.1.2 Senior Officers' Quarters

The Proposed Action for the three Senior Officers' Quarters that are eligible for the NRHP is to demolish them after conducting appropriate mitigation measures. The Proposed Action would result in the loss of significant historic resources on a state and national level. Demolition would prevent adaptive reuse of these historic resources as discussed in Section 2.2, Alternative Actions. The Proposed Action would have an adverse effect on three historic resources, requiring mitigation per Section 106 of the National Historic Preservation Act (NHPA) of 1966. A Historic American Buildings Survey (HABS) would be required before demolishing the houses.

The HABS process is designed to produce high quality documentation of a building prior to demolition. HABS documentation would record the houses, their construction, and their setting. Since each Senior Officers' Quarters is significant on a state and national level, all three potential levels of HABS documentation would need to be performed on all three buildings.

In terms of the demolition, as with the standard housing units, the contractor hired to conduct the demolition activities for the three Senior Officers' Quarters would be required to completely remove all aspects of the structures, including the houses themselves, associated garages, foundations, and driveways up to the sidewalk boundary. After removal of all of the resulting demolition material, each structure's footprint would be leveled. The contractor would be directed to minimize to the fullest extent possible the injury and destruction of existing vegetation. Conservation of as many large trees as possible is a goal for MHAFB.



The contractor would be responsible for conducting all demolition, removal, and disposal activities in accordance with applicable local, state, and Federal laws and regulations. The contractor would ensure that all specifications related to ACM and LBP removal and disposal were followed.

2.2 ALTERNATIVE ACTIONS

The following section describes three Alternative Actions to the Proposed Action for the three Senior Officers' Quarters. Each Alternative Action would require consultation with the Idaho SHPO and HABS documentation.

2.2.1 Alternative 1 – Visitor Welcome Center at Front Gate

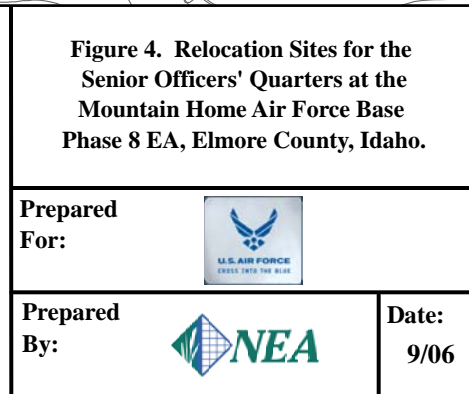
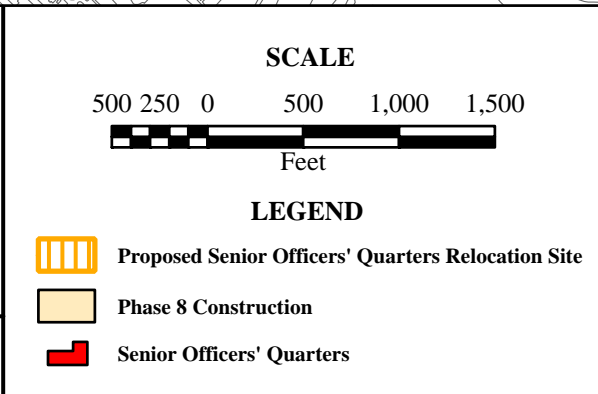
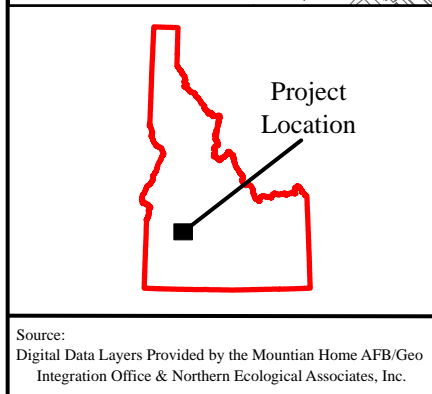
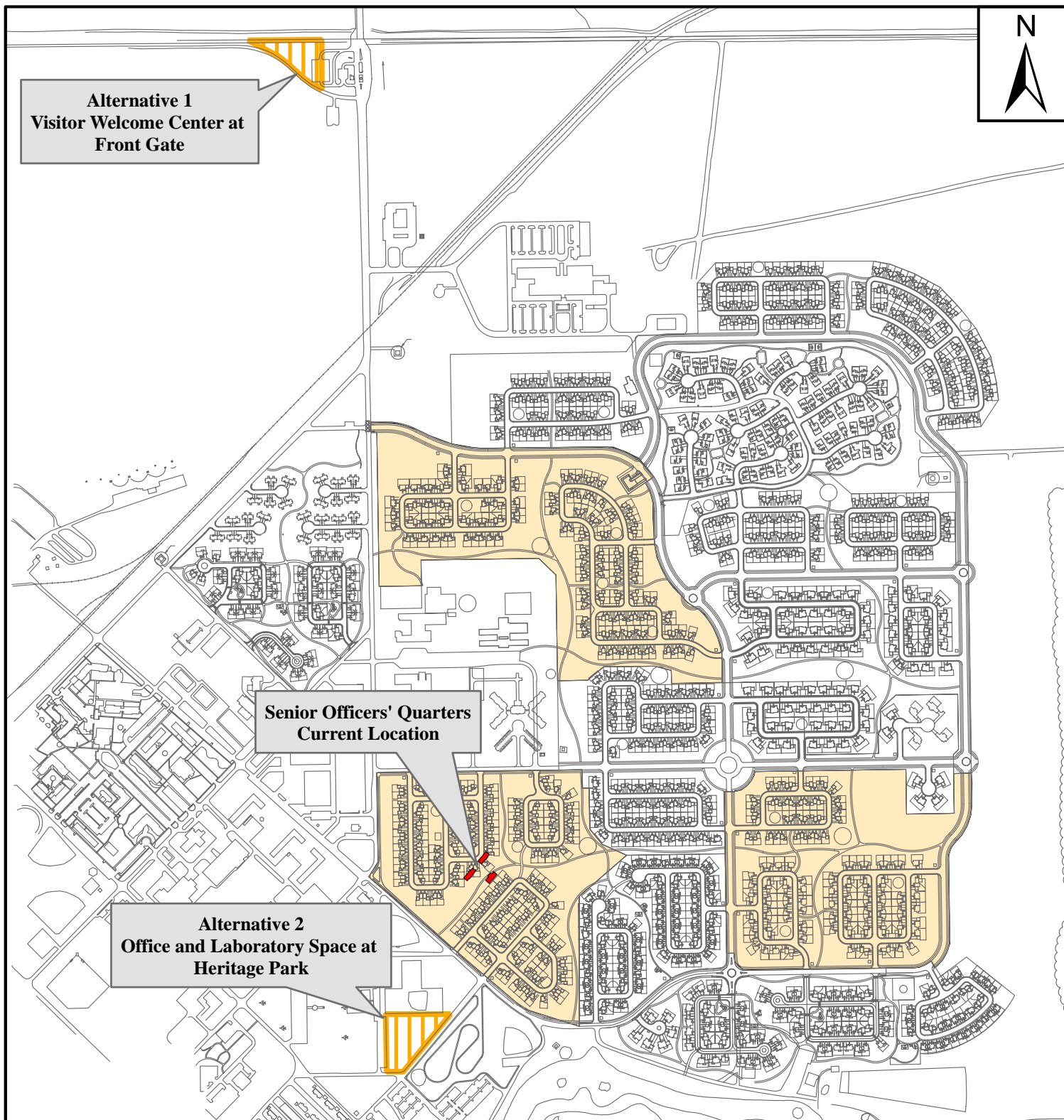
This action would consist of moving one of the three Senior Officers' Quarters to MHAFFB's front gate area (Figure 4). The open floor plan of any of the three houses lends itself to use as a visitor welcome center, a function that is currently lacking at MHAFFB. By relocating one of the houses to the front gate area, it would be prominently displayed at the entrance to MHAFFB. The convenient, prominent location of the front gate area is particularly well suited to the utilization of the house as a visitor welcome center. This is also an ideal location for one of the Senior Officers' Quarters since it provides MHAFFB with an opportunity to showcase its architecture and history.

One disadvantage of relocating a Senior Officer's Quarter to the front gate area is that it would not be adjacent to other housing units, or structures in general. There would be an adverse effect on the house's setting, since the feeling and association of the house's original setting within Gunfighter Manor was of a residential neighborhood of one-story residences. It would also be necessary to provide an appropriate number of parking spaces for public use, which could diminish the integrity of the setting, feeling, and association of the house within the new site. The setting at the front gate area would have to be landscaped appropriately to reflect the house's historic surroundings.

HABS would be required for all three houses to record their existing setting before moving one of the Senior Officers' Quarters. It is also anticipated that the Idaho SHPO would request MHAFFB to restore or maintain outside historic elements as much as possible: windows, doors, exterior finishes. It is anticipated that the larger interior spaces (e.g., living room, dining room) would remain intact for public use as a visitor welcome center, while smaller interior spaces (e.g., bedrooms) would likely be used as related office space.

Relocation would necessitate a new foundation for the structure since the current concrete slab-on-grade floor system can not be moved. To provide for easier access for maintenance and upgrades, and to increase insulation value, MHAFFB would elevate the house slightly (in consultation with SHPO) when the new foundation was prepared. An elevated new foundation would create a crawl space for utilities, making the building easier and less costly to maintain in





the future. The houses currently have 3-4 inches of concrete visible above grade. Raising a building to add crawl space would mean that approximately one foot of concrete would be visible.

Additionally, air vents would intermittently punctuate the higher concrete stem wall for airflow through the crawl space. Consequently, a higher concrete stem wall and six to eight metal vents would be visible along each wall. The slight elevation change of the structure would slightly affect the original materials and design of the houses. The proposed new use of the house would also require upgrades for public use so that the structure was in compliance with building codes, fire codes, mechanical/electrical codes, and handicap access requirements

2.2.2 Alternative 2 – Office and Laboratory Space at Heritage Park

This action would consist of moving one of the three Senior Officers' Quarters to the Airplane Display section of Heritage Park (Figure 4). The layout of the interior space within each of the houses is amenable to their use as an office and archeological laboratory and research space, a function that is currently lacking at MHAFFB. MHAFFB has identified a need on the base for offices for Archaeology, History, and Protocol personnel, as well as a need for an archaeological laboratory and research space. The ample garage areas of each house, with built in cabinets and storage areas, are particularly well suited to laboratory and research space.

In this alternative, the Senior Officers' Quarters selected for relocation would be integrated into the "heritage-themed" area of MHAFFB. Relocation of the selected house would be less complicated and expensive than relocation to the front gate area (Section 2.2.1), because Heritage Park is a short distance from the existing location of the structures. The lot is also devoid of trees and landscaping, thereby reducing the complication and expense of the relocation activity.

A disadvantage to relocating one of the Senior Officers' Quarters to Heritage Park is that it would not be adjacent to other housing units, or structures in general. Although the Heritage Park location is relatively close to the houses' original site, there would be an adverse effect to the house's setting, since the feeling and association of the house's original setting within Gunfighter Manor was of a residential neighborhood of one-story residences. It would also be necessary to provide an appropriate number of parking spaces for public use, which could diminish the integrity of the setting, feeling, and association of the house within the new site. The setting at Heritage Park would have to be landscaped appropriately to reflect the house's historic surroundings, requiring the introduction of large trees and lawn areas.

HABS would be required for all three houses to record their existing setting before moving one of the houses. It is also anticipated that the Idaho SHPO would request MHAFFB to restore or maintain outside historic elements as much as possible: windows, doors, exterior finishes. It is anticipated that: 1) the larger interior spaces (e.g., living room, dining room) would remain intact for use as meeting and office research areas, 2) the garage area would remain intact for use as a laboratory, and 3) the smaller interior spaces (e.g., bedrooms) would be used as office space.



Relocation would necessitate a new foundation for the structure since the current concrete slab-on-grade floor system can not be moved. To provide for easier access for maintenance and upgrades, and to increase insulation value, MHAFB would probably elevate the house slightly when the new foundation was prepared. An elevated new foundation would create a crawl space for utilities, making the building easier and less costly to maintain in the future. The houses currently have 3-4 inches of concrete visible above grade. Raising a building to add crawl space would mean that approximately one foot of concrete would be visible.

Additionally, air vents would intermittently punctuate the higher concrete stem wall for airflow through the crawl space. Consequently, a higher concrete stem wall and six to eight metal vents would be visible along each wall. The slight elevation change of the structure would slightly affect the original materials and design of the houses. The proposed new use of the house would also require upgrades for public use so that the structure was in compliance with building codes, fire codes, mechanical/electrical codes, and handicap access requirements

2.2.3 Alternative 3 – Donate

In this alternative, one or more of the three Senior Officers' Quarters would be removed off base at the expense of a new owner. Before moving any of the houses, HABS would be required for each structure to record the house, its construction, and its setting. If a new owner were found who was willing to accept the expense of moving one or more of the structures, this alternative provides for the opportunity to preserve one or all of the houses. However, regardless of what a new owner did with the structure(s) or where they were relocated, removing the Senior Officers' Quarters from their historic MHAFB context would adversely effect all of the structures.

The completion of Section 106 and HABS documentation of the houses would be required prior to the transfer of ownership and relocation. Transfer of ownership would also require an approval process through Air Combat Command Headquarters (ACC/A7RR). All regulations and procedures that dictate the donation of buildings within the Air Force would have to be followed (Air Force Instruction 32-9004).

Relocation of the structures by a new owner would take the buildings out of the Federal property realm and into private ownership. Depending on the intent of the new owner, accessibility to them by the public (which would occur in the other two alternatives to the Proposed Action) could diminish. Conversely, a private owner could embrace the history of the structures and desire to restore them for public viewing.

2.3 NO ACTION ALTERNATIVE

CEQ regulations require that NEPA documents include a No Action Alternative that evaluates the impacts of not implementing a Proposed Action or any other alternative. The No Action Alternative for Phase 8 MFH is three-fold: the 436 standard housing units would not be demolished, the 457 housing units would not be constructed, and the historic properties in the footprint of Phase 8 would not be demolished. The No Action Alternative consists of not implementing any component of Phase 8 of MFH on MHAFB.



Under the No Action Alternative, the Senior Officers' Quarters would remain in their original location and continue to be used as housing. Since these properties are of "particular importance" per the Program Comment (Section 3.4.1), routine maintenance and alterations would have special guidelines to preserve the historic fabric of each residence. Landscaping is a dynamic element and careful attention would need to be paid to the long-term landscape plan around each residence.

Under the No Action Alternative, military personnel would continue to live in housing units that do not meet current USAF housing standards or are structurally deteriorated beyond repair. Under this alternative, the philosophy of whole-house/whole-neighborhood would not be implemented at MHAFB. Under this alternative, the 436 standard housing units and the three Senior Officers' Quarters would continue to need regular maintenance and repair, resulting in the disruption of USAF personnel and their families. The lack of modern living facilities could negatively impact morale on the base and the retention of qualified personnel.

Although the No-Action Alternative would avoid Project-related impacts to the natural and cultural environment, the quality and sustainability of MFH at MHAFB would degrade, compromising the military mission of MHAFB. Therefore, the No Action Alternative would not satisfy the purpose and need of the Proposed Action.

2.4 ACTIONS CONSIDERED BUT NOT CARRIED FORWARD

In addition to the Proposed Action, Alternative Actions, and the No Action alternative, several additional actions were considered for the three Senior Officers' Quarters but not carried forward. Each of these additional actions is identified and briefly discussed below, and each would require consultation with SHPO.

2.4.1 Retain Senior Officers' Quarters in Historic Setting

This action would consist of retaining the Senior Officers' Quarters in their current setting and utilizing them as housing for airmen. The historic "island" setting of historic houses would be retained, but compromised because of a jogging path that would bisect the connecting yards. This action was not carried forward primarily because the new housing constructed around the Senior Officers' Quarters would be two-story Georgian style housing units, and locating the long and narrow single-story Senior Officers' Quarters near the two-story Georgian style buildings would severely detract from the feeling and association of the houses within a single-story residential setting. Any architectural style of two-story housing units would negatively impact the feeling and association of the houses within a single-story residential setting. Without appropriate viewshed mitigation, this action would have a permanent, adverse effect on the Senior Officers' Quarters in this setting. In addition, this alternative would not allow the Senior Officers' Quarters to be available for multiple use, including public use, and seven to nine of the planned houses in Phase 8 would have to be relocated.



2.4.2 Move Senior Officers' Quarters near Gunfighter Officer's Club

This action would consist of moving the three Senior Officers' Quarters to a lot located north of the current Gunfighter Officer's Club. This action would integrate the houses into the "heritage themed" area of MHAFB and would lend itself to re-use of the houses for several potential space utilizations. HABS documentation, a new foundation, and public use upgrades would be required for this alternative. This action was not carried forward primarily because of the undesirable adjacency of the buildings to two-story Georgian style homes in the Eagle View community. Locating the long and narrow single-story Senior Officers' Quarters near the two-story Georgian style buildings would severely detract from the feeling and association of the houses within a single-story residential setting. Without appropriate viewshed mitigation, this action would result in a permanent, adverse affect on the structures.

2.4.3 Move Senior Officers' Quarters to Old Officer's Club

This action would consist of moving the three Senior Officers' Quarters to the location of the Old Officer's Club, at the intersection of Falcon Street and Central Road. This site is adjacent to MHAFB family services, the housing office, and the Sagebrush hotel, which currently serves as visitor lodging. In this location, potential space utilizations include a visitor's center, a Gunfighter history library and research center, and an educational space. HABS documentation, a new foundation, and public use upgrades would be required for this alternative. However, the Old Officer's Club location is outside of the original Wherry-Capehart housing footprint (Section 3.4.1). Compared to the original residential location, the more "commercial" aspects of this site would diminish the integrity of the structures' setting, feeling, and association.

2.4.4 Retain Senior Officers' Quarters in Place and Use for Temporary Quarters

Under this action, the three Senior Officers' Quarters would be retained in place and utilized for distinguished visitors' quarters, temporary living facilities, and/or visiting officers' quarters. This action was not carried forward for several reasons. First, the houses would be set within a community of new two-story Georgian style houses, which would severely detract from the current feeling and association of the houses within a single-story residential setting. Second, this change in usage would require that MHAFB's Services and Lodging assume responsibility for the operation and maintenance of the buildings, therefore limiting the houses to residential use. Third, the necessary renovation of the houses would be costly and Services and Lodging does not currently have funds to complete the required renovation.

2.4.5 Move Senior Officers' Quarters and Use for Temporary Quarters

This action would consist of moving the three Senior Officers' Quarters to an undetermined site and utilizing them for distinguished visitors quarters, temporary living facilities, and/or visiting officer's quarters. Although the houses would retain their historic function as housing, this action was not carried forward primarily because Services and Lodging at MHAFB would assume responsibility for the operation and maintenance of the houses and their budget can not currently accommodate the additional expenses.



2.4.6 Move Senior Officers' Quarters and Use as Officers Quarters

This action would consist of moving the three Senior Officers' Quarters to an undetermined site and utilizing them for officer's quarters. Although the houses would retain their historic function as housing, this action was not carried forward primarily because Services and Lodging at MHAFB would assume responsibility for the operation and maintenance of the houses and its budget can not currently accommodate the additional expenses.



3.0 AFFECTED ENVIRONMENT

This section provides information on the existing environmental, cultural, and social conditions at the MHAFFB.

3.1 GEOLOGY, SOILS, AND TOPOGRAPHY

MHAFFB is located on the Mountain Home Plateau in the western Snake River Plain (CH2MHILL 2004), a structural basin trending to the northwest surrounded by high angle faults that is thought to be a result of crustal rifting that began 16 million years ago and ended 3 million years ago (Malde 1991). Deposits of basalts and rhyolites are present due to early volcanic activity in the area. Remnant cones, vents, and shield volcanoes are present in the area of MHAFFB (USAF ACC 1996).

Thick deposits of silts, sands, clay, ash, and gravels are found on top of these volcanic deposits as a result of a large body of water, known as Lake Idaho, that developed in the western Snake River Plain approximately 8 million years ago (Gillerman and Bonnicksen 1990). Lake Idaho drained approximately 2 million years ago, linking the Snake and Columbia rivers (USAF ACC 1996).

The following soil types, typical of semi-arid regions, comprise areas within MHAFFB where Phase 8 of MFH would be implemented: Bahem silt loam (0-4% slope), Minveno silt loam (0-4% slope), and MinveNo Minidoka stony silt loam (0-8% slope) (CH2MHILL 2004). According to the Integrated Natural Resource Management Plan (CH2MHILL 2004), these soil types lack organic matter, have poor drainage, and a moderate potential for water and wind erosion. No prime or unique farmland soils are located at the MHAFFB (AFCEE 1999).

The topography of MHAFFB consists of flat to gently rolling hills and plateaus. The average elevation of MHAFFB is 2,900 to 3,100 feet (CH2MHILL 2004).

3.2 WATER RESOURCES

3.2.1 Ground Water

The principal aquifer for the MHAFFB is the Bruneau Formation (AFCEE 1999), which also provides water to the city of Mountain Home and surrounding areas (CH2MHILL 2004). The Bruneau Formation is an unconfined aquifer approximately 400 feet below ground surface that is comprised mostly of coarse sands. The Bruneau Formation is recharged mainly by subsurface flow (AFCEE 1999).

Groundwater is the only source of potable water for MHAFFB. Wells on base are able to yield from 10 to 3,500 gallons per minute (AFCEE 1999). MHAFFB pumps about 800,000 gallons of water per day from late fall to early spring (USAF ACC 1996) and approximately 6 million gallons per day (MGD) during summer, of which 80 to 90 percent is used for irrigation. In



conjunction with the water usage of the city of Mountain Home, the rate of water usage exceeds that of recharge. As such, the water table at MHAFB is dropping on average of 2.07 feet per year (Bendixsen 1994). However, the Idaho Department of Water Resources has indicated that the Bruneau Formation aquifer should be able to provide water for the next 100 years (AFCEE 1999).

The groundwater source utilized by MHAFB is designated a Groundwater Management Area, which means that restrictions are placed on potential new users so that water rights claims to existing users are not impacted (AFCEE 1999).

3.2.2 Surface Water

MHAFB is located within the C.J. Strike Dam Recreation Annex Watershed and has a drainage area of about 55 square miles (CH2MHILL 2004). No significant drainages or natural surface water impoundments exist on the MHAFB (USAF ACC 2003a, USAF ACC 2003b). Open water sources at MHAFB include sewage lagoons along the western boundary of the base and a storage area along the southern portion of the golf course where recycled water is stored for watering the golf course.

Surface water on the base flows northeast to southeast and then into Canyon Creek, which eventually empties into the Snake River. Surface water due to snowmelt and storm events flows into four manmade drainages ditches, two ephemeral streams, and/or nine playas (i.e., small basins that collect but do not discharge surface water) (AFCEE 1999). Two manmade drainage ditches, two ephemeral streams, and one playa are located within Phase 8 of the MFH (CH2MHILL 2004). Surface water is typically good quality (AFCEE 1999).

3.2.3 Wetlands

A wetland delineation survey conducted by the USAF ACC in 1990 found nine playas, or vernal pools, on the MHAFB (CH2MHILL 2004). One of these playas is located approximately 500 feet east of the proposed Desert Pines neighborhood. An ecosystem survey conducted in 1995 confirmed the number and location of the playas (ASAF ACC 1996). However, according to the U.S. Army Corps of Engineers, playas are not jurisdictional wetlands (CH2MHILL 2004).

3.2.4 Floodplains

According to Federal Emergency Management Agency (FEMA) maps, there are no 100-year floodplains located on MHAFB (FEMA 1988).

3.3 BIOLOGICAL RESOURCES

3.3.1 Vegetative Communities

The MHAFB is located in an area classified as the Intermountain Sagebrush Province/Sagebrush Steppe Ecosystem (CH2MHILL 2004). The MHAFB used to be comprised primarily of



sagebrush grassland habitat that included Wyoming big sagebrush (*Artemisia tridentata wyomingensis*) with an understory of native forbs and grasses including Thurber's needlegrass (*Stipa thurberiana*), needle-and-thread grass (*Stipa comata*), and bottlebrush squirreltail (*Sitanion hystrix*). In many locations salt desert shrub communities such as shadscale (*Atriplex confertifolia*), greasewood (*Sarcobatus vermiculatus*), and four-wing saltbush (*Atriplex canescens*), are interspersed with the Wyoming sagebrush community (CH2MHILL 2004).

Most of the base has been converted to buildings, runways and other paved areas, training facilities, rubble piles and landfills, and sewage treatment ponds. Furthermore, a majority of open space on the MHAFFB is grassland area vegetated with exotic and invasive species such as Russian thistle (*Salsola kali*), annual kochia (*Kochia scoparia*), and bur buttercup (*Ranunculus testiculatus*), with occurrences of Idaho listed noxious species such as field bindweed (*Convolvulus arvensis*), dodder (*Cuscuta* spp.), perennial sowthistle (*Sonchus arvensis*), and whitetop (*Cardaris draba*) (CH2MHILL 2004).

Two native plant communities remain on the MHAFFB: Wyoming big sagebrush and winterfat (*Ceratoides lanata*) (AFCEE 1999). These communities comprise approximately 390 acres or an estimated 6.9 percent of the MHAFFB. Of the approximate 390 acres, there is one 10-acre area of winterfat and eight areas of Wyoming big sagebrush reported on MHAFFB.

Due to the invasion of exotic species and disturbance in these areas, the native plant communities are not considered pristine (USAF ACC 2003a). A natural resource management goal of MHAFFB is to protect remnant Wyoming sagebrush habitat. Only the southernmost Phase 8 demolition and construction areas are located within a small portion of an area mapped as Wyoming big sagebrush habitat (CH2MHILL 2004). Additionally, a small portion of weedy annual grassland would be affected by Phase 8 in this same general area (CH2MHILL 2004).

3.3.2 Wildlife Habitat

Due to the limited availability of undeveloped or undisturbed habitat, wildlife species at the MHAFFB are mostly smaller species that are capable of surviving and adapting to development and disturbed conditions. According to the *Integrated Natural Resource Management Plan* (CH2MHILL 2004), wildlife species utilize five different habitat types on MHAFFB: 1) sagebrush flats; 2) rubble piles; 3) landscaped areas around buildings and structures; 4) flat areas of exotic weed grassland species; and, 5) sewage storage lagoons and rapid infiltration basins. Of these five habitats, Phase 8 MFH includes landscaped areas, a small section of sagebrush flat, and weedy grassland areas.

In addition, scavenger species such as common ravens, black-billed magpies, starlings, California gulls, and coyotes utilize the active landfill on base as a food resource. The pits of the landfill also provides habitat for bank swallows, barn owls, and western burrowing owls (MHAFFB 2006).

The following presents a summary of wildlife species known to occur in habitats present within Phase 8 of MFH on MHAFFB. Detailed information regarding wildlife species and habitat



utilization can be found in the *Integrated Natural Resource Management Plan (INRMP)* (CH2MHILL 2004). A comprehensive species list is also provided in Appendix A (94 species of animals, representing 47 families, have been recorded on MHAFFB; MHAFFB 2006).

Mammal species known to occur at the MHAFFB include mountain cottontails (*Sylvilagus nuttallii*), Great Basin ground squirrels (*Spermophilus mollis*), deer mice (*Peromyscus maniculatus*), house mice (*Mus musculus*), badgers (*Taxidea taxus*), coyotes (*Canis latrans*), and several species of bat.

In addition, raptors such as the prairie falcon (*Falco mexicanus*), American kestrel (*Falco sparverius*), red-tailed hawk (*Buteo jamaicensis*), great-horned owl (*Bubo virginianus*), and burrowing owl (*Athene cinicularia*) have been observed on the MHAFFB. Prairie falcons are known to nest in the Snake River Canyon to the south of MHAFFB, but suitable nesting habitat does not occur on MHAFFB. Burrowing owls occupy abandoned badger burrows, suitable rubble pipes, grassland habitats and vegetated buffer areas along the golf course. American kestrels occupy grassland habitat and are most likely nesting in trees and buildings on the MHAFFB. Great-horned owls and red-tailed hawks have been observed nesting in mature trees on the MHAFFB. Other raptors that may utilize various habitats on the MHAFFB include northern harriers (*Circus cyaneus*), short-eared owls (*Asio flammeus*) and golden eagles (*Aquila chrysaetos*).

Bird species known to occur on the MHAFFB include house finches (*Carpodacus mexicanus*), American robins (*Turdus migratorius*), killdeer (*Charadrius vociferus*), western meadowlarks (*Sturnella neglecta*), grackles (*Quiscalus quiscula*) and starlings (*Sturnus vulgaris*). Other species that have been documented using landscaped areas, annual grassland areas, sagebrush flats, and ditches on the MHAFFB include savannah (*Passerculus sandwichensis*), sage (*Amphispiza belli*), and Vesper sparrows (*Pooecetes gramineus*). Waterfowl have only been documented using the storage lagoons, which are not located within or near Phase 8 of MFH on MHAFFB (CH2MHILL 2004).

Reptiles known to occur on the MHAFFB include rattlesnakes (*Crotalus viridis*) and gopher snakes (*Pituophis catenifer deserticola*). However, the habitats utilized by these species have not been documented (CH2MHILL 2004). Other species that could potentially occur on the MHAFFB include Pacific tree frogs (*Hyla regilla*), garter snakes (*Thamnophis spp.*) and sagebrush lizard (*Sceloporus graciosus*). Pacific tree frog and garter snakes would likely utilize habitat that are subject to irrigation in and around residential areas and landscape buffers. The sagebrush lizard, if present on the MHAFFB, would likely be found in and around the small sagebrush flat area.

MHAFFB has been surveyed for species of concern (USAF ACC 2003a). No Federally-listed species and/or habitats are known to occur on MHAFFB, although the bald eagle (*Haliaeetus leucocephalus*) may use the base as a foraging area. However, the bald eagle has never been observed on base. The long billed curlew (*Numenius americanus*) is a Federal Trust Species, an Idaho protected species, and a Bureau of Land Management (BLM) state-listed sensitive species that has been observed utilizing various habitats on MHAFFB including grasslands, wet meadows



and shrub-steppe (CH2MHILL 2004). Burrowing owls, also a BLM state-listed sensitive species, are known to occupy abandoned badger and rodent burrows in grassland areas and along MHAFFB's golf course. No reported locations of burrowing owls are located within the project demolition and/or construction sites of Phase 8 (CH2MHILL 2004).

3.4 CULTURAL RESOURCES

Section 3.4 is divided into two main parts. First, background information relevant to the importance and historical context of the Senior Officer's Buildings is presented. Second, the historic significance of the Senior Officer's Buildings is described in relation to the themes highlighted in the background section.

Section 3.4 does not describe any other cultural resources in the project area because 1) there are no other architectural resources within the housing areas on MHAFFB, and 2) there are also no prehistoric and historical archaeological resources in the area, including Native American traditional cultural resources (AFCEE 1999).

3.4.1 Background

3.4.1.1 Wherry and Capehart Military Housing Programs

America's housing shortage began in the late 1920s, continued with the Great Depression of the 1930s, and was exacerbated by the funneling of building materials into the war effort until the mid-1940s. Following World War II, returning service men and women across the country experienced a shortage of housing. In the late 1940s the build-up to support the Cold War effort commenced and with this endeavor came a need to substantially improve housing on military bases. Better housing on military bases was seen as a means to retain service men and women who had been highly trained and educated during the previous war effort.

Two Federal programs were developed to ease this situation. The first program was sponsored by Senator Wherry of Nebraska and was implemented between 1949 and 1955. This program enabled developers to receive financing from the FHA to construct and maintain housing on military bases. The second program occurred between 1955 and 1962 and was designed by Senator Capehart of Indiana. It required the Department of Defense to purchase the housing constructed by developers on bases. Together, these two programs accounted for nearly 250,000 housing units built during this period and substantially eased the shortages of military family dwellings. As described below (Section 3.4.1.2), both Wherry and Capehart Housing is subject to the Program Comment between the Department of Defense and the Advisory Council on Historic Preservation.

In Idaho, MHAFFB benefited from both the Wherry and Capehart programs. Wherry housing, completed in 1956, consisted of ninety-five multiple family units of six-plexes, four-plexes, and duplexes for a total of 494 single-family units. The Wherry Neighborhood was known as "Oasis", which created a connotation of spacious living although it was actually congested and minimal outdoor living area was incorporated into the design.



Construction of Capehart housing began in 1957 and continued through 1962. This program at MHAFB was comprised of duplexes and single-family units. The neighborhoods created with Capehart housing provided broad streets and open spaces for playgrounds and park areas. Four individual Senior Noncommissioned Officers (SNCO) houses were initially constructed. Then the Gunfighter Manor neighborhood was constructed, consisting of fifty-three duplexes and three single family units, of which the latter are now the National Register-eligible Senior Officers' Quarters designed by the collaborative team of Neutra and Alexander and Hummel, Hummel and Jones. The third area of development in the Capehart program was Presidential Acres, comprised of 210 duplexes and four single-family units.

3.4.1.2 Program Comment on Wherry and Capehart Era Housing

In November 2004 the Advisory Council on Historic Preservation (ACHP) accepted a Program Comment that allows the Navy and Air Force to comply with the NHPA regarding management of housing, associated structures, and landscape features from the Wherry and Capehart programs for the period of 1949-1962. This Program Comment was based on similar language approved in 2002 for the Army for this type of housing.

The Navy and the Air Force requested this service-wide Section 106 compliance so as to

“...facilitate management actions for maintenance, repair, layaway, mothballing, privatization and transfer out of Federal agency ownership, substantial alteration through renovation, demolition, and demolition and replacement of Wherry and Capehart Era housing, associated structures, and landscape features. Such actions present a potential for adverse effects to historic properties.”

With a Program Comment in place, the Navy and Air Force would avoid lengthy case-by-case compliance actions for Section 106 of the NHPA. Specifically, this Program Comment has a separate requirement for properties of “particular importance” whereby a degree of preservation is to be considered. This includes a process for determining the particular importance and a “commitment to consider preservation through continued use as military housing, within funding and mission constraints.”

3.4.1.3 Hummel, Hummel, and Jones

In the early 1890s, John Tourtellotte, originally from Connecticut, established himself as an architect in Boise, Idaho. By 1895 his firm was known as Tourtellotte and Company, with one of the employees being a formally trained architect, a German gentleman by the name of Charles Hummel. The enterprise evolved to include Hummel as a partner and it is from this late 19th century beginning that the current architectural firm of Hummel Architects in Boise, Idaho was initially established. Hummel's sons, Frederick and Frank, and later Frederick's son, Charles, continued the firm and created an architectural legacy in the State of Idaho. The firm's work has spanned over a century, moving beyond the borders of the state and includes an impressive



portfolio of governmental, institutional, commercial, religious, and residential projects with the State Capitol being one of the firm's premier projects.

As the firm evolved through the decades, the partnership evolved. In 1945 Jedd Jones, III joined Frederick and Frank Hummel in the firm as the third partner, creating the new name of Hummel, Hummel, and Jones. It is the result of this liaison that the firm entered into the realm of military projects as Jedd Jones had been a college classmate with Robert Alexander of Neutra and Alexander Architects in California. Their acquaintance provided the basis for the joint venture on the housing project at MHAFB. When the project was announced, Hummel, Hummel, and Jones teamed with Neutra and Alexander and won the commission that consisted of the design of 270 housing units on the base.

These housing units formed the basis of the neighborhoods of Gunfighter Manor and Presidential Acres. Most of the 270 housing units have undergone significant and repeated remodeling. Only the three, large single-family residences of the 270 units – the Senior Officers Quarters – retain the structural integrity and historic significance necessary to make them eligible for listing on the NRHP.

3.4.1.4 Neutra and Alexander

Richard Neutra was born in Vienna, Austria in 1892 and immigrated in 1923 to the United States. In 1925 he found his architectural footing in America and settled in Los Angeles, California. Prior to his move to California, he worked briefly in the offices of his mentors: Louis Sullivan and Frank Lloyd Wright. For the next 25 years, Neutra's career flourished and he became known for his design of luxury residences in southern California. In 1949 he began a co-operative venture with another architect, Robert Alexander. Together their partnership produced large commissions within the realms of housing developments, and commercial, institutional, and government projects.

In the early 1950s, Neutra and Alexander pursued government commissions resulting from the Cold War military build-up. Their earliest project was the planning and architectural redevelopment of the World War II-ravaged island of Guam. Though never fully realized, this commission aligned them for further government work. In the mid-1950s, the largest government contracts realized for their firm were for two military housing projects, one at Mountain Home Air Force Base in Idaho and the other at Lemoore Naval Air Base near Fresno, California. With the removal of the housing at Lemoore Naval Air Base, the only base that retains Wherry and Capehart-era examples of Neutra's work is MHAFB.

It was at MHAFB that much needed family housing within the Capehart Housing Program created the association of Neutra and Alexander Architects with the local firm of Hummel, Hummel, and Jones. The result that remains today in Gunfighter Manor are the three Senior Officers Quarters that embrace the collaborative effort of both architectural firms that are in this instance defined as being of "particular importance" within the Department of Defense's Program Comment for Wherry and Capehart Housing.



3.4.1.5 Design Elements

The architectural drawings for the neighborhood of housing units that were designed by the team of Hummel, Hummel, and Jones, and Neutra and Alexander are dated 1958. The site design was based on a hierarchical arrangement of housing units, with the three commanding officers' homes centrally located on a single block or "island" within the complex. Streets circulating the neighborhood were lined with homes for the non-commissioned officers, consisting of single-family units and duplexes. This suburban arrangement, with driveways leading to attached garages, embraced the evolving automobile-based culture of the United States.

Neutra's influence on the design of the three MHAFB homes for commissioned officers is evident from other Neutra post-war designs completed for larger residential commissions during this period. Elements from his 1930s pallet are evident – large walls of windows in the living areas; narrower, linked bands of windows in the private rooms; shallow or nearly flat roofs with deep overhangs; open multi-use spaces; and, less formal kitchen/dining/living rooms. Specific Neutra design elements that are evident in the MHAFB design include: 1) a floor plan arranged in a longitudinal fashion with the main entry foyer bisecting the functions of the house, 2) an open area of kitchen, dining, and living rooms arranged to one side of the main foyer while a long hall with bedrooms and bathrooms extends in the opposite direction.

The thick end walls of each home are constructed of "brick block." Brick block is referred to as jumbo brick in the masonry industry, and each brick unit is four and a half times the size of a common brick (4" x 8" x 12"). With larger-scale brick units, walls have a blockier appearance. The long walls are wood frame punctuated with long bands of windows at the kitchen, bedrooms, and baths. Vast windows extend the view from the living and dining rooms to the outdoors at the rear of the house. The roofline varies minimally in height, and although nearly flat in construction it allows for higher ceilings in the living and dining rooms.

Landscaping of these homes was planned in two ways. First, an "oasis wall" or screen wall about five feet in height, constructed of masonry, was used to create a private courtyard in the front of the house, accessible from the kitchen and via a gate. This private courtyard provided an enclosed play yard for children visible from the band of windows at the kitchen. Second, the living and dining rooms opened onto a long, narrow patio that was sheltered with a deep overhang. A large rear yard provided landscaped space for entertaining.

The siting and landscaping of his designs were important elements of his work, and are evident at MHAFB. Though developed for the high desert climate, the MHAFB housing development has aged nicely into a green landscape. In addition, Neutra's 1950s selection of warmer and more relaxed materials (e.g., wood and stone) was in contrast to the cold, tense, machined materials of the 1930s.

3.4.2 Historic Significance

It is the combination of all three themes discussed in Section 3.4.1 that contribute to the importance of the Senior Officers' Quarters: Wherry and Capehart Housing Programs, Hummel,



Hummel and Jones, and Neutra and Alexander Architects. The collaboration of the design team of Hummel, Hummel and Jones and Neutra and Alexander gives individual significance to the Senior Officers' Quarters at both the state and national levels. On the national level, historic significance is determined by the incorporation of the firm of Neutra and Alexander as part of the Capehart housing project design team.

The early work of Hummel Architects' predecessor exists throughout Idaho and has already gained historic significance. Currently a Multiple Properties Listing of Tourtellotte and Hummel Architecture encompassing the works of the firm through 1945 is listed on the National Register of Historic Places. Within this listing these works are considered a "thematic resource" and the firm is the *sole* architectural firm so recognized in the state, therefore elevating this firm to a prominent position in the realm of the entire state's architecture. On the national level, historic significance is underscored by the association of Neutra and Alexander Architects as part of the Capehart housing project design team. Richard Neutra's recognition as an internationally renowned architect builds upon this significance and emphasizes its importance.

Within the State of Idaho, as in any other state, the Federal Government (in this case the Air Force) is considered a "visitor." The establishment of MHAFB occurred within the state's borders and the significance of each of these residences is important as a resource within the history and development of Idaho as well as within the Federal military establishment. The Idaho SHPO considers the Senior Officers' Quarters highly valuable historic resources.

3.5 AIR RESOURCES

Under the provisions of the Clean Air Act (CAA) the U.S. Environmental Protection Agency (USEPA) sets minimum limits on air pollutant levels within the United States. Individual states may adopt stricter air pollution controls, but they may not adopt less stringent air pollution controls than allowed by the USEPA. The USEPA has set two types of air quality standards, including primary standards that set limits to protect public health and secondary standards that set limits to protect public welfare (i.e., impacts to visibility; damage to animals, crops, plants, and buildings).

The significance of the pollutant concentration is determined by comparing it to the Federal and state air quality standards. The USEPA has established National Ambient Air Quality Standards (NAAQS) for six criteria pollutants: ozone (O₃), carbon monoxide (CO), nitrogen dioxide (NO₂), sulfur dioxide (SO₂), particulate matter (includes coarse inhaleable particulate matter with an aerodynamic radius equal to or less than 10 microns and greater than 2.5 microns [PM₁₀] and fine particulate matter with an aerodynamic radius equal to or less than 2.5 microns [PM_{2.5}]), and lead (Pb). The NAAQS represent the maximum levels of exposure to a pollutant that is considered safe to health and public welfare.

Based on measured ambient criteria pollutant data, the USEPA designates areas of the United States as having air quality better than (attainment) or worse than (nonattainment) the NAAQS. States are delegated the responsibility to adopt rules and regulations and to develop plans demonstrating how they would achieve, maintain, and enforce these air quality standards.



Together, the rules and plans are known as the state's State Implementation Plan (SIP) and are the framework used to protect human health and public welfare from airborne pollutants.

3.5.1 Types and Sources of Air Quality Pollutants

Pollutants addressed in this EA include the Federal and state criteria pollutants. These include CO, SO₂, particulate matter (PM₁₀ and PM_{2.5}), and the precursors of O₃, which include volatile organic compounds (VOCs) and nitrogen oxides (NO_x). Airborne emissions of Pb are not addressed because no significant sources of this criteria pollutant are contained in the affected area and it is not associated with the Proposed Action and alternatives.

3.5.2 Location and Context of Affected Areas

The affected environment varies according to the pollutant, the source of emissions, and meteorological, and topographical conditions (USAF ACC 2003b). Emissions released at high altitudes (aircraft emissions) and buoyant emissions (such as from industrial plant smokestack) generally have larger areas of influence than non-buoyant ground-based emission sources. With pollutants that do not undergo chemical change (particulate matter and SO₂), the affected area is generally restricted to the region in the immediate vicinity of the source. However, the area of concern for ozone and its precursors (NO_x and VOC) is a larger regional area because these pollutants undergo a chemical reaction and change as they disperse from the source.

3.5.3 Existing Setting – MHAFB

MHAFB lies within the Idaho Intrastate Air Quality Control Region (AQCR) #63 and consists of 22 counties in central Idaho, including Elmore County. Air quality within AQCR #63 has been classified as "attainment" for all NAAQS criteria pollutants. The air quality at MHAFB, the city of Mountain Home, and Elmore County is considered as very good (USAF ACC 2003b).

Table 1. NAAQS Criteria Pollutant Designation for Elmore County, Idaho.

NAAQS Criteria Pollutant	USEPA Designation
Ozone (O ₃)	Attainment
Carbon Monoxide (CO)	Attainment
Nitrogen Dioxide (NO ₂)	Attainment
Sulfur Dioxide (SO ₂)	Attainment
Coarse Particulate Matter (PM ₁₀)	Attainment
Fine Particulate Matter (PM _{2.5})	Attainment
Lead (Pb)	Attainment

Source: USEPA 2006.

The Idaho Department of Environmental Quality (IDEQ) has primary jurisdiction over the air quality and source emissions at MHAFB and is regulated by CAA Title V requirements. Stationary source emissions include a number of mission related operations such as jet engine testing, external and internal combustion sources, degreasing operations, storage tanks, fueling



operations, solvent usage, surface coating, asphalt production, and miscellaneous general process operations (USAF ACC 2003b). Fugitive source emissions include aircraft operations (take offs and landings) as well as associated aerospace ground equipment and ground support equipment (USAF ACC 2003b). In addition to criteria pollutants, the MHAFB produces Hazardous Air Pollutant (HAP) emissions from various stationary sources. The MHAFB is a major source for NAAQS emissions and a minor source for HAP emissions. Accordingly, MHAFB is considered a major source of air pollution and is required to function under a Tier I Operating Permit, also known as a Title V Operating Permit. Actual emissions of criteria pollutants from the base are less than 100 tons/year (USAF ACC 2003b).

3.6 NOISE

Noise is an objectionable or unwanted sound with a standard unit of measurement as the decibel (dB). Annoyance is the primary response to noise and the degree to which a person is annoyed correlates with the day-night average sound level (DNL) (AIHA 1986). These levels of annoyance are based on long-term exposure, whereas short-term activities, such as construction noise and new flight patterns, might cause annoyance due to other factors such as one's attitude toward the activity creating the noise (AFCEE 1999).

To protect citizens from potential hearing damage and from other negative effects associated with noise, Federal and local governments have established noise guidelines and regulations. According to the USAF, Federal Aviation Administration (FAA), and Housing and Urban Development (HUD), residential areas are (AFCEE 1999):

Normally acceptable in all areas around a noise source in which the A-weighted, DNL is less than 65 dB.

Normally unacceptable in all areas around a noise source in which the A-weighted, DNL is between 65 and 75 dB unless interior noise reduction measures are incorporated to reduce A-weighted, DNL by 25 to 30 dB.

Clearly unacceptable in all areas around a noise source in which the A-weighted, DNL is greater than 75 dB.

Aircraft activity from military operations is the predominant source of noise at MHAFB. According to contours of DNL noise levels generated by aircraft (USAF ACC 2003a, USAF ACC 2003b, CH2MHILL 2004), Phase 8 demolition and construction areas are located in an area of a DNL of less than 65 dB. Other sources of noise include the movement of ground traffic, construction, and maintenance and shop operations. However, the levels of noise generated by these sources should be negligible (AFCEE 1999).

3.7 LAND USE

Land uses on MHAFB are differentiated by function and geographic location with respect to the runway, which bisects the MHAFB. The area to the southwest of the runway is predominantly undeveloped and is comprised mostly of open space (i.e., weedy annual grassland) as well as a few industrial areas (CH2MHILL 2004).



Approximately 93 percent of the base has been developed or altered. Most of the developed areas are located in the central and northeastern section of the MHAFFB and include residential, medical, and administrative facilities, industrial areas, the airfield, and recreational areas. Phase 8 of MFH on MHAFFB would affect residential land use areas, a small portion of an area mapped as Wyoming big sagebrush habitat, and a small area mapped as weedy annual grassland (CH2MHILL 2004).

Roads, runways, and buildings occupy approximately 20 to 25 percent of the MHAFFB, and another 25 percent of the base is disturbed or landscaped. The remaining area of the base is open, including partially disturbed fields. Of the open space, native habitat is only present in approximately seven percent of the MHAFFB (USAF ACC 2003a, USAF ACC 2003b).

3.8 TRANSPORTATION

Access to the main gate of MHAFFB is provided from Airbase Road off of Idaho State Route 67. Primary access to the demolition and construction areas of Phase 8 is served by existing paved two-lane roads or residential streets.

3.9 ENVIRONMENTAL MANAGEMENT

Environmental Management includes the management of waste and use of hazardous materials at MHAFFB (AFCEE 1999). The following sections discuss the type of waste and hazardous materials at MHAFFB.

3.9.1 Hazardous Waste and Materials

MHAFFB is considered a large quantity generator due to the fact that the base produces more than 2.2 pounds of acute hazardous waste or more than 2,200 pounds of hazardous waste per month. According to the Idaho Hazardous Waste Generator Annual Report for Fiscal Year (FY) 2002, the MHAFFB produced 1,115,674 pounds of hazardous waste. The types of hazardous waste generated on base include spent acids, corrosive liquids, waste from painting, combustible solvents, and battery acid (USAF ACC 2003a).

Although hazardous waste is generated from many sources on base, those sources associated with aircraft operations are the largest contributor to the amount of hazardous waste produced. Other sources of hazardous waste on base include residues and contaminated material produced from groundwater and soil remediation activities; wastewater treatment; medical facilities; and, activities that require the storage of hazardous materials including but not limited to flammable and combustible liquids, caustics, paint thinners, pesticides, solvents, fire retardant, and compressed gases on base (USAF ACC 2003a).

Hazardous wastes on MHAFFB are managed in accordance with the *MHAFFB Fighter Wing Plan 3208-05 Hazardous Waste Management Plan*. Furthermore, the storage locations and handling procedures for hazardous wastes on base are addressed in the *MHAFFB Fighter Wing Plan 3209-04 Emergency Planning and Response Plan* to reduce the potential for leaks and spills. In the



event that a spill occurs, this document also describes a response, notification, decontamination, and cleanup plan (USAF ACC 2003a).

With respect to Phase 8 of MFH on MHAFB, only small quantities of hazardous materials such as janitorial supplies, pesticides, paints, and paint thinners are present in the housing areas. In addition, housing units may have ACM and LBP. Asbestos may be found in tile and linoleum flooring, roofing and acoustical ceiling materials, and joint compound (AFCEE 1999). In a LBP study conducted by MHAFB in 1995, 100 percent of the housing units in Gunfighter Manor, Presidential Acres, the Dunes, Woodland Groves, and Oasis contained LBP (AFCEE 1999). LBP was found on doorframes, window sills and jambs, thresholds, and wood soffits (AFCEE 1999).

Within the MHAFB housing areas, maintenance contractors store hazardous materials (i.e., paint thinners, paint, etc.) and hazardous waste (i.e., rags with thinners and paint and waste paint) in buildings 4401 and 4402 prior to being transported to a permitted storage facility. A licensed contractor disposes of the hazardous waste (AFCEE 1999).

3.9.2 Petroleum Storage Tanks

Petroleum storage tanks in the residential areas of MHAFB are exclusively heating oil tanks. During the 1980s, all of the housing units on MHAFB were converted from oil heating systems to gas heating systems. Since underground heating oil tanks did not show up on construction plans, MHAFB hired contractors to locate the tanks, pump out any residual oil, and then fill them with an inert material like sand (K. Wilson, *personal communication*).

As phases of MFH have been implemented since the 1980s, MHAFB has initiated a Best Management Practice whereby all underground heating oil tanks are removed during MFH demolition activities. A backhoe is used to dig down to the tank, clear off surface soil, and then peel off the top of the tank. Soil is tested for contaminants, and all contaminated soil is removed and disposed of in a suitable facility (K. Wilson, *personal communication*).

3.9.3 Environmental Restoration Program Sites

The Environmental Restoration Program (ERP) identifies, reports, and corrects deficiencies from past disposal activities that could result in contamination of the environment. MHAFB has 32 sites in the ERP. Of the 32 sites, 31 are on the National Priority List (NPL) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). According to a Record of Decision in 1995, one site was closed without requirements, no remedial actions were required for 30 of the sites, and long-term monitoring was indicated for one site. None of the ERP sites are located within the housing areas (AFCEE 1999).

3.9.4 Solid Waste

A solid waste landfill used for the disposal of base-generated non-hazardous wastes is located in the southwest corner of MHAFB. In FY 2005, the landfill accepted 2,621 tons of household



waste, 334 tons of construction and demolition waste, and 81 tons of ACM waste (A. Binder, *personal communication*). The landfill is not located within Phase 8 of MFH on MHAFB. Although it was estimated that the landfill would have capacity until 2016 (AFCEE 1999), the landfill is slated for closure in Fall 2006 due to recent policy decisions by ACC regarding the desirability of landfills on Air Force bases. Landfill capacity exists nearby the base, and contracts to accommodate the solid waste needs of MHAFB will be established. (C. Rudeen, *personal communication*).

As part of the Pollution Prevention program on base, recyclable materials such as aluminum, paper, tin, cardboard, wood, glass, and plastic are picked up and delivered to the recycling center, which is located in Building 1800, which is located outside of Phase 8 (AFCEE 1999).

3.9.5 Wastewater

The wastewater treatment plant on MHAFB is a sequenced batch reactor plant that came on-line in 1997. The plant treats wastewater from housing areas, industrial facilities, and aircraft operations after the effluent is passed through oil separators. The wastewater treatment plant contains eleven infiltration basins. The capacity of the wastewater treatment plant is 2.55 million gallons per day at an average flow of 0.45 million gallons per day (C. Rudeen, *personal communication*).

MHAFB has two NPDES permits: one for wastewater and one for storm water. The wastewater discharge permit allows discharges up to 16 days per year. Discharges can be necessary during storm events when inflow exceeds the capacity of the wastewater treatment plant. In such a situation, the MHAFB would discharge the additional storm water into a tributary of Canyon Creek for a period no longer than 24 hours and not in excess of 3 million gallons (AFCEE 1999). To date, the base has never had to discharge wastewater and instead has been utilizing land application practices per MHAFB's State of Idaho wastewater land application permit (C. Rudeen, *personal communication*). The stormwater NPDES permit has no volume limits but does have pollutant limits. It allows the base to discharge off-base and in the past has typically been utilized once/year.

The sewage system at MHAFB was constructed more than 50 years ago. As such, some of the lines have deteriorated and are leaking. In addition the system contains storm to sewer connects. MHAFB has upgraded and replaced sewer lines and lift/pump stations and installed a new sewer collection system as part of previous base improvement projects.

3.10 SOCIOECONOMICS

The proposed alternatives of Phase 8 of the MFH on MHAFB could affect economic features such as population, housing, and employment and earnings of communities and counties whose economic features are related to actions at the base. Activities on MHAFB have the ability to affect the socioeconomics of Elmore, Ada, and Owyhee counties.



MHAFB accounts for more than one-third of the economic input into Elmore County. Furthermore, almost half of the population of the county is dependent on the base to some degree and it is estimated that MHAFB would account for 50 percent of future development and growth of the county (AFCEE 1999). As such, the following sections discuss economic features with respect to the tri-county area providing specifics for Elmore County, where available, but focus only on Elmore County in the section that discusses employment and earnings.

3.10.1 Population

The population in 2000 of Elmore, Ada, and Owyhee counties was 340,678, a 44 percent increase from 1990. Most of the population (i.e., 77 percent) in 2000 resided in incorporated communities, the largest of those being (from the highest to lowest populations) Boise, Meridian, Mountain Home, Eagle, and Garden City (U.S. Census Bureau 2003). The estimated population of Elmore County in 1998 was 24,500 individuals (AFCEE 1999). In 1999 10,743 individuals resided in the city of Mountain Home, Elmore County (USAF ACC 2003a, USAF 2003b).

Population on MHAFB in FY 01 was 6,282. Most personnel (i.e., about 57 percent) that do not live on base reside in Mountain Home (USAF ACC 2003a, USAF 2003b).

3.10.2 Housing

In the counties of Elmore, Ada, and Owyhee, there were 133,495 housing units in 2000. However, a Housing Market Analysis (USAF ACC 2003a, USAF ACC 2003b) determined that the housing market for the base includes only those portions of Elmore and Owyhee counties that are within a 30-minute commute during peak hours of traffic. In addition the study concluded that there is a housing deficit for military families of 1,688 units and for unaccompanied personnel of 226 units (USAF ACC 2003a, USAF ACC 2003b). Within the housing market, the only significant housing center is the city of Mountain Home in Elmore County. There were 401 vacant housing units in 2000, however, most of them were rental units (USAF ACC 2003a, USAF ACC 2003b).

In a separate socioeconomic analysis, the analysis sections estimated the place of residence (by zip code) of active MHAFB personnel (USAF 2001 in USAF ACC 2003b). The analysis determined that the majority of military personnel (approximately 57%) who resided off base lived in the city of Mountain Home in Elmore County. The next largest group of active personnel resided in Boise (approximately 7%). As of FY 2001, 53 percent of active duty personnel resided on base (USAF ACC 2003a, USAF ACC 2003b).

3.10.3 Employment and Earnings

MHAFB employs 4,500 military personnel and 877 civilian employees, making the base the largest employer in Elmore County (USAF ACC 2003a, USAF 2003b). In 1997, MHAFB provided 52 percent of the employment within an area that was a driving distance of one hour from the base (AFCEE 1999).



In FY 2001 the combined payroll for military and civilian personnel at MHAFB was \$162 million and expenditures on goods and services from regional firms were in excess of \$61 million (USAF ACC 2002). It is estimated that the economic contribution of MHAFB creates about 1,690 civilian, secondary jobs (USAF ACC 2002).

3.11 ENVIRONMENTAL JUSTICE

The purpose of Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, is to avoid the disproportionate placement of adverse environmental, economic, social, or health impacts from government activities and policies on minority and low-income populations (AFCEE 1999).

The population of Elmore County in 2000 was 29,130, of which approximately 15 percent comprised the minority population of the county. The Census Bureau estimated that in 2003, approximately 11.7 percent of residents in Elmore County were living in poverty, an estimate that is roughly equivalent to the percentage of residents in the state that were impoverished (i.e., 11.8 percent) (USCB 2003).



4.0 ENVIRONMENTAL CONSEQUENCES

This section describes potential environmental consequences for the Proposed Action, Alternatives Actions, and the No Action Alternative.

4.1 GEOLOGY, SOILS, AND TOPOGRAPHY

4.1.1 Proposed Action

The Proposed Action would have a minimal impact on geology, soils, and topography. Excavations and earth moving activities associated with demolition and construction of the standard housing units and the demolition of the Senior Officers' Quarters would only affect surface soils and not disturb underlying geological formations. Topsoil would be left in place during construction activities. Accordingly, geological formations would not be impacted from the Proposed Action.

Surface soils would be disturbed during demolition of the existing MFH and construction of the new MFH. Surface soils would be compacted by heavy machinery during demolition and construction of housing units. Following removal of all demolition debris, the MFH areas would be leveled with earth moving equipment. Trenches would be excavated to either remove obsolete and/or install new underground utilities (e.g., water, sewer, and natural gas lines) as required to service the new MFH. These excavations would be backfilled following utility installation. Similarly, shallow excavations would be required for new building foundations for the MFH. The sites would then be rough graded to provide adequate working areas for construction activities. Following construction of the new MFH, final grading and landscaping measures would be implemented.

Standard measures would be taken to minimize erosion of surface soils disturbed during the demolition and construction phases of the Proposed Action. Soil erosion from wind and water would be minimized by implementation of standard Best Management Practices (BMPs) outlined by the Idaho Department of Environmental Quality – Catalog of Stormwater BMPs for Cities and Counties. Under the guidance of this document, stormwater pollution control is accomplished through the implementation of source control and treatment control measures. Implementation of these measures would include both temporary and permanent BMPs. Temporary BMPs include slope protection, storm drain and channel protection, sediment control, and runoff diversion. Permanent BMPs include slope protection, stormwater filters, infiltration filters, detention facilities and other structural controls such as oil/water separators.

4.1.2 Alternative Actions

Under the Alternative Actions for the Senior Officers' Quarters, impacts to geology, soils, and topography would be similar to that of the Proposed Action for the Senior Officers' Quarters.



4.1.3 No Action Alternative

Under the No Action Alternative, the existing MFH would not be replaced with new MFH and the Senior Officers' Quarters would not be demolished. Accordingly, geology, soils, and topography would not be affected and there would be no environmental consequences to these resources.

4.2 WATER RESOURCES

4.2.1 Proposed Action

Ground Water

The Proposed Action would have a minimal negative impact on groundwater resources. Leakage of untreated wastewater into the groundwater system would in fact be reduced by the Proposed Action via the installation of new sewer and septic systems. In this way, the introduction of nitrates into the groundwater would be lessened. Since the planting of native and drought tolerant vegetation is planned for Phase 8 MFH, and they would be watered with automatic sprinklers that avoid overwatering, less water would be used for landscaping purpose under the Proposed Action. The use of less water would not only reduce the amount of water withdrawn from groundwater resources (a positive impact) but would reduce the amount of nitrates from fertilizer additions than percolate through the soil and enter the groundwater.

Depending on the extent of the reduction in water use due to the planting of native vegetation and the new sprinkler system, overall water consumption under the Proposed Action could be slightly higher or lower than existing conditions, because 21 additional housing units would be built compared to the number demolished (i.e., 457 to 436). Residential water consumption would likely increase by approximately 5%. Prior to demolition and while unoccupied, the existing structures would be disconnected from the base's water supply system. The new MHF would be reconnected to the base's water supply system during construction.

Potential impacts to groundwater recharge areas from implementation of the Proposed Action would be minimized. Construction of the new MFH would result in only a slight increase of impermeable surfaces and therefore would not significantly affect water infiltration rates to the Bruneau Formation. In the event of a hazardous materials spill, procedures in the *MHAFB Fighter Wing Plan 3209-04 Emergency Planning and Response Plan* would be implemented to prevent contamination from reaching ground water resources.

Surface Water

The Proposed Action would have a minimal negative impact on surface waters due to the improvements in residential and impervious surface stormwater runoff measures and controls. These permanent BMPs would provide improved control of both the quality and quantity of stormwater runoff occurring on-site. These improvements include measures such as proper grading and contouring of land immediately adjacent to the construction site, proper road



installation, and integrated stormwater systems including stilling basins, catch basins and comprehensive drainage system. Slope stabilization in and around the Phase 8 construction areas would also be conducted.

In the event of a hazardous materials spill, procedures in the *MHAFB Fighter Wing Plan 3209-04 Emergency Planning and Response Plan* would be implemented to prevent contamination from reaching surface waters.

Wetlands

The Proposed Action would result in no impacts to wetland resources. No regulatory jurisdictional wetlands occur within the Proposed Action construction areas. Non-regulatory wetland resources (e.g., playas) are located outside of the active construction zone and would be protected from potential sedimentation through proper implementation of standard BMPs.

Floodplains

No floodplain resources exist within the MHAFB, therefore the Proposed Action would result in no impacts to floodplains.

4.2.2 Alternative Actions

Under the Alternative Actions for the Senior Officers' Quarters, impacts to groundwater, surface water, wetlands, and floodplains would be similar to that of the Proposed Action for the Senior Officers' Quarters.

4.2.3 No Action Alternative

Under the No Action Alternative, the existing MFH would not be replaced with new MFH and the Senior Officers' Quarters would not be demolished. Accordingly, groundwater, surface water, wetlands, and floodplains would not be affected and there would be no environmental consequences to these resources.

4.3 BIOLOGICAL RESOURCES

4.3.1 Proposed Action

Vegetative Communities

The Proposed Action would result in temporary minor impacts to vegetative communities within all of the currently developed areas of Phase 8. The vegetated areas associated with the existing MFH consist of maintained lawn and ornamental trees and shrubs that were established when the existing MFH was constructed. Although one of the goals of MHAF is to preserve as many existing trees as possible, some trees and shrubs may inevitably be cut and removed along with other demolition debris.



During the demolition and construction phases of the project, the residential vegetative community at the project site would be disrupted and certain areas would be trampled by heavy machinery and construction equipment. This impact would be temporary however, since all areas would ultimately be replanted. Under the guidance of MHAFB's Integrated Management Plan (CH2MHILL 2004), general re-vegetation and landscaping following construction activities would incorporate native plant species that exhibit characteristics of drought tolerance, that have fewer maintenance requirements, and that maximize habitat value. These improvements in the species composition of the vegetative communities surrounding the new residences would positively impact the environment of MHAFB.

Vegetative communities located outside of the currently developed area in the proposed Desert Pines neighborhood would experience a permanent negative impact as a result of the proposed action. Both mapped Wyoming big sagebrush habitat and weedy annual grassland areas would be converted to developed land. The conversion of community types would occur along the easternmost edge of the Phase 8 construction area and include 0.62 acre of Wyoming big sagebrush habitat and 9.56 acres of weedy annual grassland. Tree rows would be planted on the eastern edge of Phase 8 to control desert winds and dust.

Upon completion of the Proposed Action, approximately one third of Phase 8 areas would be devoted to open space. These open space areas would be created for passive use by base personnel as playgrounds, tot lots, and general common areas. Accordingly, seeding with Type 2 turf grass (a mix of turf type tall fescue and perennial ryegrass) would be implemented to establish open grass areas. Additionally, trees and shrubs would be planted to provide shade and screening.

Wildlife Habitat

The Proposed Action would result in temporary minor impacts to wildlife habitats within the currently developed and landscaped portions of Phase 8. Much of the wildlife that utilizes the landscaped portions of Phase 8 includes common bird species and rodents. During demolition, wildlife habitats such as shade trees and hedges may be removed from active construction zones. This vegetation, which may provide food and cover for wildlife, would be unavailable for use by resident wildlife species. Mobile species such as birds, mammals, and reptiles would likely disperse to adjacent undisturbed locations during demolition/construction activities. There is a chance that some individuals may experience direct mortality as a result of demolition activities.

The Proposed Action would result in permanent minor negative impacts to wildlife habitats located outside of the currently developed area in the proposed Desert Pines neighborhood. Construction along the easternmost edge of the proposed Desert Pines neighborhood would convert 0.62 acre of Wyoming big sagebrush habitat and 9.56 acres of weedy annual grassland habitat to structures, yards, and a road. Wildlife species that utilize these habitats would likely disperse to other nearby similar habitats.

Impacts to birds could be minimized by initiating construction prior to the onset of breeding and nesting season in late spring. Many of the impacts to wildlife within the weedy annual grassland



habitat would be mitigated by the reestablishment of trees and shrubs within the landscaped portion of the MFH. The planned open grass areas, along with tree and shrub plantings, would provide foraging and nesting habitats for a wide variety of species that currently inhabit the base.

Species of Concern

Species listed, proposed for listing, or candidates for listing as threatened or endangered species in accordance with the Endangered Species Act of 1973 are not likely to be adversely affected by the Proposed Action. No Federally listed threatened or endangered species or critical habitats are known to occur on the MHAFB.

The burrowing owl, a BLM state-listed sensitive species, has been known to inhabit abandoned burrows in grassland areas of MHAFB, including areas in the vicinity of the golf course and the proposed Desert Pines community. In line with the MHAFB's Fish and Wildlife Management goal to provide protection of special status species and objective of avoiding the harassment of burrowing owls, potentially suitable habitat should be evaluated for their presence or absence prior to potentially disturbing activities (CH2MHILL 2004). Accordingly, prior to construction, potential habitat including the weedy grassland area within the proposed Desert Pines community should be surveyed for the presence of burrowing owls. Potential actions include checking for active burrows and filling potential burrows when the owls are not present in the winter (USAF ACC 2003b).

4.3.2 Alternative Actions

Under the Alternative Actions for the Senior Officers' Quarters, impacts to vegetative communities, wildlife habitat, and species of concern would be similar to that of the Proposed Action for the Senior Officers' Quarters. The Front Gate relocation site is 2.1 acres and provides habitat in the form of 1.7 acres of mapped weedy annual grassland area. The Heritage Park relocation site is 2.3 acres and is mapped as developed. Together, the relocation sites provide a minimal amount of vegetated area and associated wildlife habitat. Selection of the Donate alternative would preserve these areas of existing vegetation.

4.3.3 No Action Alternative

Under the No Action Alternative, the existing MFH would not be replaced with new MFH and the Senior Officers' Quarters would not be demolished. Accordingly, vegetative communities, wildlife, and species of concern would not be affected and there would be no environmental consequences to these resources.

4.4 CULTURAL RESOURCES

4.4.1 Proposed Action

The Proposed Action would result in an adverse effect on historic resources because it would demolish the three NRHP-eligible Senior Officers' Quarters. Prior to the demolition of these



historic resources, separate mitigation measures for each residence would be required per the Section 106 process of the NHPA of 1966. HABS documentation for each house would need to be completed, and approval of all documentation would need to be done by the NPS before demolition could proceed.

Since each Senior Officers' Quarters is significant on a state and national level, all three levels of documentation would need to be performed on all three buildings. The estimated cost for this documentation is \$45,300 per structure (Table 2). In the case of each of the three Senior Officers' Quarters, the first level would include a written historical report comprised of primary and secondary resources, such as oral histories of previous occupants, written histories of MHAFB, construction and maintenance records, and legal information. The second level of documentation would include black and white, large format photographs derived from 4 x 5 or 8 x 10 inch negatives of each of the three buildings. The photographs would be archivally stable, perspective corrective, high quality prints. The third level of documentation would involve on-site recordation of each of the three buildings, including all exterior and interior aspects and important details.

Table 2. Estimated Costs for HABS Documentation for Each Senior Officers' Structure.

Senior Officers' Quarters	HABS Documentation			
	Level 1¹	Level 2²	Level 3³	Total Cost
General's Residence	\$5,625	\$15,000	\$24,675	\$45,300
Commander's Residence	\$5,625	\$15,000	\$24,675	\$45,300
Colonel's Residence	\$5,625	\$15,000	\$24,675	\$45,300
Grand Total				\$135,900

1 - the first level would include a written historical report comprised of primary and secondary resources, such as oral histories of previous occupants, written histories of MHAFB, construction and maintenance records, and legal information.

2 - the second level would include black and white, large format photographs derived from 4 x 5 or 8 x 10 inch negatives of each of the three buildings. The photographs would be archivally stable, perspective corrective, high quality prints.

3 - the third level of documentation would involve on-site recordation of each of the three buildings, including all exterior and interior aspects and important details.



An important aspect of HABS documentation would be a site plan depicting landscaping and built elements associated with each building (e.g., patios, fencing, oasis walls). The construction and current character of each building would be described by utilizing floor plans, exterior elevations, wall sections, and details. The measurements of these items for each building would be used to prepare finished drawings. Historically, these drawings were produced using pen and ink on archival quality paper; now computer-aided drafting (CAD) systems are utilized. Other items that could be part of the final HABS package include reproductions of historical photos, original drawings, and taped interviews. After all levels of documentation were completed and approved by the National Park Service, the entire package would be deposited in Library of Congress.

General's Residence – Building # 4478

A complete HABS documentation would be conducted (Table 2). The HABS package would include a written report of the history of the General's Residence, large-format photographic documentation, and the preparation of a set of measured drawings depicting the built environment including the site as it currently exists. Oral histories of past Generals and their families residing in the house would be conducted. Historic photographs and original construction drawings would be reproduced and included in the HABS package.

Commander's Residence – Building # 4473

A complete HABS documentation would be conducted (Table 2). The HABS package would include a written report of the history of the Commander's Residence, large-format photographic documentation, and the preparation of a set of measured drawings depicting the built environment including the site as it currently exists. Oral histories of past Commanders and their families residing in the house would be conducted. Historic photographs and original construction drawings would be reproduced and included in the HABS package.

Colonel's Residence – Building # 4476

A complete HABS documentation would be conducted (Table 2). The HABS package would include a written report of the history of the Colonel's Residence, large-format photographic documentation, and the preparation of a set of measured drawings depicting the built environment including the site as it currently exists. Oral histories of past Colonels and their families residing in the house would be conducted. Historic photographs and original construction drawings would be reproduced and included in the HABS package.

After all mitigation measures were completed, the contractor hired to conduct the demolition activities would be required to completely remove all aspects of the Senior Officers Quarters, including the units themselves, associated garages, foundations, and driveways up to the sidewalk boundary. After removal of all of the resulting demolition material, each housing unit footprint would be leveled. The contractor would be directed to minimize to the fullest extent possible the injury and destruction of existing vegetation. Conservation of the mature trees is a goal for MHAFFB.



The contractor would be responsible for conducting all demolition, removal, and disposal activities in accordance with applicable local, state, and Federal laws and regulations. The contractor would ensure that all specifications related to ACM and LBP removal and disposal were followed.

Table 3. Summary of Mitigation Requirements and Adverse Effect for the Senior Officers' Quarters for the Proposed Action and Each Alternative Action.

Alternatives for Phase 8 MFH at MHAFB	HABS Required?	Additional Mitigation Proposed?¹	Amount of Damage to Historic Fabric	Is Damage to Historic Fabric Repairable?
Proposed Action – <i>Demolition of All Three Historic Structures</i>	Yes	Yes	High	No
Alternative 1 – <i>Reuse of One Historic Structure as a Visitor Welcome Center at the Front Gate</i>	Yes	Yes	Moderate	Yes (for one structure)
Alternative 2 – <i>Reuse of One Historic Structure as Office and Laboratory Space at Heritage Park</i>	Yes	Yes	Moderate	Yes (for one structure)
Alternative 3 – <i>Donate One or More of the Historic Structures Off-Base</i>	Yes	Yes	Moderate	Yes (for moved structure(s))
No Action Alternative – <i>Phase 8 Military Family Housing is Not Implemented at MHAFB</i>	No	No	None	NA

1 – The appropriateness of additional mitigation will be decided upon during the Section 106 (NHPA) consultation process with SHPO.

4.4.2 Alternative Actions

Under the Alternative Actions for the Senior Officers Quarters, impacts to cultural resources for moving the houses to the Front Gate or to Heritage Park would be similar. The Donate alternative would be the most intrusive of the three Alternative Actions because the houses would be transferred out of Federal agency ownership and moved off base.



Alternative 1 – Visitor Welcome Center at Front Gate

The Front Gate site is currently devoid of landscaping. Moving one of the Senior Officers' Quarters to the site would necessitate incorporating landscaping and parking. Introducing trees large enough to offset the feeling of an empty site would be costlier than if some trees already existed. Total landscaping of the entire site, including larger trees, would make landscaping this site expensive.

At the Front Gate, creating a parking area could easily be accomplished at the rear of the relocated house and, thus, remain out of sight. Parking at the Front Gate was estimated as twice what would be required at the Heritage Park site, because of increased traffic and public use. Handicapped parking could occur at the front of the house if a semi-circular driveway were created.

The expense of SHPO-required HABS documentation prior to the demolition of the two remaining Senior Officers Quarters would be incurred by MHAFFB in this alternative.

Alternative 2 – Office and Laboratory Space at Heritage Park

The Heritage Park site is currently devoid of landscaping. Moving one of the Senior Officers' Quarters to the site would necessitate incorporating landscaping and parking. Introducing trees large enough to offset the feeling of an empty site would be costlier than if some trees already existed. Total landscaping of the entire site, including larger trees, would make landscaping this site expensive.

At Heritage Park, creating a parking area could easily be accomplished at the rear of the relocated house and, thus, remain out of sight. Handicapped parking could occur at the front of the house if a semi-circular driveway were created.

The expense of SHPO-required HABS documentation prior to the demolition of the two remaining Senior Officers Quarters would be incurred by MHAFFB in this alternative.

Alternative 3 – Donate

The Donate alternative would result in the permanent loss of the Senior Officers Quarters at MHAFFB. Under this alternative, if a buyer were found for one or more of the houses, the new owner would incur the costs of moving the structure(s), including pre-move demolition and temporary construction requirements. MHAFFB would be responsible for disconnecting utilities and would be involved in coordinating the move from their existing location to beyond the main gate of the base. Demolishing any of the houses that were not donated to a new owner would be the responsibility of MHAFFB. It is anticipated that this cost would be incorporated into the total cost of removing the Gunfighter Manor housing. As required by SHPO, the cost of HABS documentation prior to transfer of ownership would be borne by MHAFFB.



Relocation

Based on an architectural conditions survey (Appendix B), the three existing structures appear to be in very good structural condition. The Proposed Action for the Senior Officers' Quarters does not include moving the structures, but each of the three Alternative Actions does. It is structurally feasible to move any one of the three structures and maintain the structural integrity necessary to meet the minimum code requirements prescribed for historic structures (Appendix B). There are no foreseen structural complications with potential future foundation systems proposed for these buildings, nor are there any foreseen complications at the two proposed known alternative sites, which are relatively level, with consistent soil types and similar wind exposure.

The Senior Officers' Quarters were constructed with a slab on grade floor system, so moving them is more complex and costly than if they were on a wood frame floor system (Appendix C). Each of the three moving methods involves installing two large beams 12 in. wide x 36 in. deep lengthwise and eight to ten beams 12 in. wide x 12 in. deep crosswise through the house. This creates a grid of support to lift and move each house. The first method is the easiest and most cost effective, yet the most detrimental to the house, and involves piercing the building from the exterior with steel beams. The second method involves trenching around each house and underneath each house and placing the beams beneath the wall frame system at the bottom plate. The third method is to install the beams, from the interior, within the wood frame wall system of each house without destroying the exterior or keeping damage to the exterior at a minimum. Each of these methods and estimated associated costs is described in Appendix C.

Cost Estimates

Alternative Actions 1 and 2 involve the rehabilitation of one of the Senior Officers' Quarters. In each instance, the cost for that alternative would include the cost for HABS documentation on all three structures, moving costs for one structure (using the least invasive method), and costs to establish one house on the new site in a completely rehabilitated condition (Table 4; Appendix D). The cost to MHAFFB for Alternative 3, Donate, would be the cost of HABS documentation for all three structures (Table 4).

Alternate 1, Visitor Welcome Center at Front Gate, would completely rehabilitate the building to include a visitor entry, exhibit space, and work/office area. The costs for this upgrade would include handicap accessibility, interior remodeling, and landscaping the site, including parking provisions.

Alternate 2, the Office and Laboratory Space at Heritage Park, would completely rehabilitate the building to include a laboratory, work/office areas, and storage space. The costs for this upgrade would include handicap accessibility, interior remodeling, and landscaping the site, including parking provisions.

The costs associated with the moving and complete rehabilitation of the house on the selected new site for Alternatives 1 and 2 are based on investigations by two building moving experts



Table 4. Preliminary Cost Estimates for Activities Related to the Senior Officers' Quarters for Each Alternative.

Alternatives for Phase 8 MFH at MHAFB	Demolition²	Historic American Buildings Survey³	Additional Mitigation⁴	Relocation and Rehabilitation⁵	Total Cost
Proposed Action – Demolition of All Three Historic Structures	\$36,000	\$135,900	Estimated Cost x 3	\$0	\$171,900 ⁹
Alternative 1 – Reuse of One Historic Structure as a Visitor Welcome Center at the Front Gate¹	\$24,000	\$135,900	Estimated Cost x 3	\$598,495 ⁶	\$758,395 ⁹
Alternative 2 – Reuse of One Historic Structure as Office and Laboratory Space at Heritage Park¹	\$24,000	\$135,900	Estimated Cost x 3	\$546,555 ⁶	\$706,455 ⁹
Alternative 3 – Donate One or More of the Historic Structures Off-Base	\$0 – \$24,000 ⁷	\$135,900	Estimated Cost x 3	\$0 ⁸	\$135,900 - \$159,900 ⁹
No Action Alternative – Phase 8 Military Family Housing is Not Implemented at MHAFB	\$0	\$0	\$0	\$0	\$0

1 – Relocation and rehabilitation of one of the Senior Officers' Quarters; demolition of the other two structures.

2 – Costs reflect the estimated additional cost of demolishing the historic structures during the overall Phase 8 demolition process.

3 – Costs reflect estimated costs for all three levels of HABS documentation.

4 – Costs are unknown at this time. MHAFB would consult with SHPO on the appropriate amount of additional mitigation, as necessary.

5 – Costs reflect estimated costs for preparing the structure for moving; physically moving the structure; rehabilitating the structure after the move; and all landscaping costs, including parking considerations (Appendix D).

6 – Costs reflect the average (\$42,500) of the range of estimated costs for physically moving the structure (\$35,000 - \$50,000).

7 – Costs reflect a range from the donation of all three historic structures (\$0 for demolition) to the donation of one historic structure (\$24,000 for the demolition of two structures).

8 – The new owner, not MHAFB, would not pay the bulk of the relocation and rehabilitation costs. MHAFB would, for example, disconnect utilities prior to relocation, and these costs would be part of the overall demolition costs.

9 – Amount shown would be increased by the cost of additional mitigation, if any is deemed necessary after consultation with SHPO.



from the Boise area, the expertise of a construction cost estimator, and utilization of the Means Residential Repair and Remodeling Contractor's Pricing Guide (Means 2006).

The only potential variations in costs per site are dependent on the existence and location of site utilities. If utilities need to be extended to the houses from a great distance, the costs per house, per site would increase. At this time the specific layout of utilities for each site is unknown. Otherwise, moving costs should be the same from site to site. The difference in costs between Alternate 1 and 2 is the rehabilitation of interior finishes and furnishing requirements based on the new function of the building.

4.4.3 No Action Alternative

Under the No Action Alternative, the existing MFH would not be replaced with new MFH and the Senior Officers' Quarters would not be demolished. The Senior Officers' Quarters would remain in their existing location and continue to be used for housing. They would also continue to require cyclical maintenance and system upgrades, and since these properties are of "particular importance" per the Program Comment (Section 3.4.1), routine maintenance and alterations would have special guidelines to preserve the historic fabric of each residence. Landscaping is a dynamic element and careful attention would need to be paid to the long-term landscape plan around each residence. Under the No Action Alternative, adverse effects to historic cultural resources would be avoided.

4.5 AIR RESOURCES

4.5.1 Proposed Action

Impacts to air quality would be considered significant if the Proposed Action resulted in violations of a NAAQS, contributed to an existing or projected air quality violation, exposed sensitive receptors to substantial pollutant concentrations, represented an increase of more than ten percent within an AQCR, or exceeded any significance criteria established by the SIP (AFCEE 1999). Emissions from the Proposed Action are either "presumed to conform" (based on emission levels that are considered insignificant in the context of overall regional emissions) or must demonstrate conformity with the SIP through a detailed analysis of direct and indirect emissions from all activities related to the Proposed Action that would affect regional air quality (USAF ACC 2003b).

Emissions generated during construction projects are temporary in nature and would cease when construction is completed. Potential direct emissions from the Proposed Action during construction include combustive emissions from heavy equipment, fugitive dust, and vapors from fuels, solvents, construction adhesives, paving activities, and paints. These emissions would vary from day to day depending on the construction phase, level of activity, and the prevailing weather conditions. Potential indirect emissions associated with the Proposed Action include worker and material transportation.



Several actions should be implemented to minimize emissions resulting from the Proposed Action. The primary localized pollutant generated during construction would be particulate matter. Fugitive dust (PM₁₀) and fine particulate matter (PM_{2.5}) would be effectively reduced by the implementation of control measures in accordance with standard construction practices and BMPs. For example, frequent spraying of water on exposed soil during construction and prompt replacement of groundcover are common landscaping procedures that could be used to minimize the amount of dust generated during construction. Avoiding long periods when engines are idling and implementation of efficient grading practices would reduce combustion emissions from heavy equipment. Additionally, carpooling would reduce vehicular emissions from workers commuting to and from the construction site.

Other than temporary construction impacts, the Proposed Action would not directly change or substantially increase emissions of NAAQS criteria pollutants because no new fuel sources would be used and no emission-producing facilities would be constructed or operated. In addition, the Proposed Action would not contribute to an existing or projected air quality violation, expose sensitive receptors to substantial pollutant concentrations, represent an increase of more than ten percent within an AQCR, or exceed any significance criteria established by the SIP.

4.5.2 Alternative Actions

Under the Alternative Actions for the Senior Officers' Quarters, impacts to air quality would be similar to that of the Proposed Action for the Senior Officers' Quarters.

4.5.3 No Action Alternative

Under the No Action Alternative, the existing MFH would not be replaced with new MFH and the Senior Officers' Quarters would not be demolished. Accordingly, air emissions would not be produced and there would be no environmental consequences to air quality.

4.6 NOISE

4.6.1 Proposed Action

The Proposed Action would result in minor, temporary increases in localized noise levels in the vicinity of Phase 8 during demolition and construction activities. The MHAFB is an active installation that typically experiences high noise levels from daily flight operations. The Proposed Action is primarily located in an area of a DNL of less than 65 dB. Phase 8 would not directly involve the construction and operation of permanent noise-generating facilities.

Heavy machinery would be used for demolition, site preparation, and construction during implementation of Phase 8. The noise produced from these sources would be similar to normal construction noise, last only the duration of specific demolition and construction activities, and would be reduced by the use of equipment sound mufflers and restricting construction activity to normal working hours (i.e., between 7:00 am and 5:00 pm).



Noise producing activities such as earth moving, grading, and building construction typically produce average noise levels of 75 dB measured at 200 feet. Point source noise is reduced by normal atmospheric absorption by 6 dB for each doubling of distance, whereby a noise level of 75 db at 200 feet is 69 db at 400 feet and 63 db at 800 feet (USAF ACC 2003b). These noise levels would be within the normal noise contours in Phase 8 area as determined by the Air Installation Compatible Use Zone (USAF ACC 2003b).

Noise sensitive receptors near Phase 8 include the elementary and junior high school annexes and adjacent MFH. The school receptors are located as close as 300 feet from the nearest demolition and construction zones. Adjacent MFH are located directly adjacent to construction areas and up to approximately 2,000 feet away from Phase 8.

4.6.2 Alternative Actions

Under the Alternative Actions for the Senior Officers' Quarters, impacts to noise sensitive receptors would be similar to that of the Proposed Action for the Senior Officers' Quarters. Construction noise at the front gate would temporarily affect visitors and base personnel as they entered and left MHAFB. Construction noise at Heritage Park would temporarily affect adjacent noise sensitive receptors at the Eagle View community, the Airplane Display, and nearby ball parks. There would be no impact to noise sensitive receptors from the Donate alternative.

4.6.3 No Action Alternative

Under the No Action Alternative, the existing MFH would not be replaced with new MFH and the existing Senior Officers' Quarters would not be demolished. Accordingly, there would be no net increase in noise levels and there would be no environmental consequences to noise receptors.

4.7 LAND USE

4.7.1 Proposed Action

The current land uses within the existing MFH area of Phase 8 are primarily residential with minor amounts of industrial, commercial, Wyoming big sagebrush, and weedy annual grassland. Implementation of Phase 8 would convert the Wyoming big sagebrush and weedy annual grassland to residential land use. The conversion of 0.62 acre of Wyoming big sagebrush habitat would be done in accordance with the MHAFB Wyoming big sagebrush management plan. Accordingly, the Proposed Action would have minimal negative impacts on land uses within the existing MFH area of Phase 8.

4.7.2 Alternative Actions

Under the Alternative Actions for the Senior Officers' Quarters, relocating one of them to the front gate for a visitor center or to Heritage Park for office and laboratory space would result in



no change to existing land use, as both areas are currently mapped as commercial, services, and administration. The Donate alternative would not impact land use on MHAFB.

4.7.3 No Action Alternative

Under the No Action Alternative, the existing MFH would not be replaced with new MFH and the Senior Officers' Quarters would not be demolished. Accordingly, there would be no impact on land use on MHAFB.

4.8 TRANSPORTATION

4.8.1 Proposed Action

Implementation of the Proposed Action would result in realignment of existing streets and construction of new streets within each of the new neighborhoods with the exception of Eagle View. These infrastructure upgrades would provide safe and efficient transportation to and from residences and would reflect the USAF's whole-house/whole-neighborhood philosophy.

Main access routes, such as Gunfighter Avenue would not be upgraded or modified. However, there may be temporary traffic delays from trucks delivering heavy equipment and materials to Phase 8 areas. Additionally, there would be a temporary increase in dump truck traffic on base roads from transportation of demolition debris to the approved disposal site.

Gunfighter Avenue is the main access route for the Elementary and Junior School Annexes, as well as the base's hospital. Access to the school annex from Gunfighter Avenue could be interrupted during construction activities; however, traffic could easily be re-routed on other base streets to alleviate any temporary interruptions. The base hospital is located north of Phase 8 and would not be affected by the Proposed Action.

Although there would be some temporary disruptions in traffic flow during construction, the new street alignments would provide safe and efficient transportation routes within the new neighborhoods and contribute to the USAF's whole-house/whole-neighborhood philosophy. Accordingly, the Proposed Action would have some temporary, minor, negative impacts on transportation during the demolition and construction phases; however, the street upgrades would provide long-term beneficial impacts to base personnel.

4.8.2 Alternative Actions

Under the Alternative Actions, one of the Senior Officers' Quarters would be moved on base from between 1.3 miles (Front Gate site – Alternative 1) to 0.3 of a mile (Heritage Park site – Alternative 2). The Donate alternative (Alternative 3) would move a structure approximately 1.3 miles on base and a currently unknown distance off base.

Under Alternatives 1 and 3, traffic flow would therefore be temporarily disrupted on Falcon Street, Gunfighter Avenue, and Aardvark Avenue when one of the Senior Officers' Quarters was



physically transported from its existing location to the new site. Under Alternative 2, traffic flow would be temporarily disrupted on Falcon Street and First Avenue when one of the Senior Officers' Quarters was physically transported from its existing location to Heritage Park.

The Senior Officer's Quarter selected for relocation would be transported from its current location on trailers specially designed to withstand enormous loads. To ensure safe and efficient transportation of the buildings, the streets utilized for the move would be temporarily closed to normal traffic, which would be re-routed using existing base roads and streets. These road closures could last for approximately 2 hours. No upgrades to existing roads would be required to transport the building. However, several overhead power lines may have to be extended in height to allow the buildings to pass safely. Traffic patterns would return to normal once the building was successfully transported.

Among the three Alternative Actions, Alternative 2 (Heritage Park) would entail the shortest physical move of a building, and as such, a shorter road distance would be disrupted and potential impacts to transportation routes would be less than Alternatives 1 and 3.

Overall, under any of the Alternative Actions, motorists would only be inconvenienced during periods when a building was being physically transported on base roads and there would be a minor, temporary impact on transportation routes.

4.8.3 No Action Alternative

Under the No Action Alternative, the existing MFH would not be replaced with new MFH and the Senior Officers' Quarters would not be demolished. Accordingly, there would be no need to transport the Senior Officers' Quarters on existing base roadways, resulting in no environmental consequences to transportation routes.

4.9 ENVIRONMENTAL MANAGEMENT

4.9.1 Proposed Action

Hazardous Waste and Materials

The Proposed Action would have minimal negative impact on the generation or disposal of hazardous waste and materials. Prior to demolition of the existing MFH and Senior Officers' Quarters, existing hazardous waste materials within the housing units such as janitorial supplies, pesticides, paints, and paint thinners would be removed and stored or disposed of in accordance with the MHAFFB *Fighter Wing Plan 3208-05 Hazardous Waste Management Plan* and the MHAFFB *Fighter Wing Plan 3209-04 Emergency Planning and Response Plan*. In addition, each housing unit would be tested for ACM and LBP. In the event that these materials are found, base policies regarding careful removal and disposal of these materials would be followed. Appropriate measures would be required during demolition to ensure worker safety and prevent releases into the environment.



During construction, hazardous materials such as paints, paint thinners, construction adhesives, and cleaners would be utilized. The construction contractor would be required to build or provide an approved storage facility to prevent potential releases of these materials into the environment (USAF ACC 2003b).

Petroleum Storage Tanks

During demolition, there is potential that underground heating oil tanks may be uncovered. In accord with MHAFB's Best Management Practices for heating oil tanks (Section 3.9.2) and the regulations of the Idaho Administrative Procedures Act regulations (AFCEE 1999), any uncovered heating oil tanks would be removed and properly disposed of off-base. Since all the new housing units in Phase 8 are heated with gas, upon completion of Phase 8 activities there would be a net decrease in the number of petroleum storage tanks located within MFH.

Environmental Restoration Program Sites

There are no ERP sites located within MFH, and none of the ERP sites located at MHAFB would be affected by Phase 8 demolition and construction activities. Accordingly, the Proposed Action would have no impact on ERP sites.

Solid Waste

Demolition of the existing MFH and construction of the new units would generate construction and demolition waste during a relatively short period of time. Based on existing information, the Proposed Action includes a total of approximately 725,000 square feet of new construction and 700,000 square feet of demolition. Standard equations exist for estimating solid waste generation from housing units: tons of solid waste = square feet of construction multiplied by 4.4 lbs/sq ft divided by 2,000 lbs/ton; and, tons of solid waste = square feet of demolition multiplied by 77.6 lbs/sq ft divided by 2,000 lbs/ton (USEPA 1998). By using these equations and the appropriate square footage, it was calculated that construction and demolition activities would together create approximately 28,755 tons of construction-related waste.

Once fully occupied, a slight net increase in household solid waste generation would be expected because of the 21 additional housing units, which should account for an approximately 5% increase in residential solid waste. MHAFB has implemented a recovery and recycling program for solid waste that may reduce the volume of material handled at the landfill. In addition, a new private municipal solid waste landfill is being developed 25 miles from the base that could possibly handle future waste disposal requirements.

Accordingly, there would be a short-term increase in the amount of solid waste produced during construction and renovation activities. All construction and demolition waste would be disposed of by the construction contractor at an approved and permitted off-site landfill. Following construction, there would be a slight net increase in solid waste generated from the new MFH that could easily be handled by the base's existing solid waste landfill, resulting in a minimal long-term impact to solid waste facilities.



Wastewater

Following construction, the new MFH would likely generate a slight net increase in the volume of wastewater generated at MHAFB. Once fully occupied, wastewater production would likely be slightly higher than existing conditions because of the 21 additional housing units. Currently, the wastewater treatment plant receives an average of 0.85 MGD and has capacity for an additional 1.7 MGD. This reserve capacity is sufficient to accept the slight increase in wastewater volume that would be produced from the new MFH. Currently, the wastewater treatment plant exceeds its maximum capacity of 2.55 MGD only during significant storm events. Accordingly, the Proposed Action would have minimal impacts to wastewater.

4.9.2 Alternative Actions

Under the Alternative Actions for the Senior Officers' Quarters, impacts to environmental management issues would be similar to that of the Proposed Action. Wastewater generation would slightly increase under the Alternatives 1 or 2, but any small percentage increase in wastewater generation from reuse of the buildings as a welcome center or office and laboratory space could be handled by the base's existing wastewater treatment system.

4.9.3 No Action Alternative

Under the No Action Alternative, the existing MFH would not be replaced with new MFH and the existing Senior Officers' Quarters would not be demolished. Accordingly, hazardous waste and materials, petroleum storage tanks, ERP sites, solid waste, and wastewater would not be affected and there would be no environmental consequences to these resources.

4.10 SOCIOECONOMICS

4.10.1 Proposed Action

Population

The population of MHAFB would experience a temporary inconvenient due to the implementation of the Proposed Action. Residents currently living in the existing MFH, including the Senior Officers' Quarters, would be moved to temporary housing during construction of the proposed standard housing units. Once construction of the new MFH is completed, the residents would move into the new housing. Implementation of the Proposed Action would result in an increase of 21 housing units in the Phase 8 area. Accordingly, the availability of new MFH would provide housing for personnel that currently commute to and from the base on a day-to-day basis. It is unlikely that the population at the base would decrease.

Housing

The housing replaced by implementation of Phase 8 would have a long-term beneficial impact on housing resources at MHAFB. Existing MFH in Phase 8 does not currently meet USAF housing



standards and may contribute to low morale. The new MFH would provide base residents with modern housing that reflects the USAF whole-house/whole-neighborhood philosophy.

According to the Mountain Home Master Plan 2005, the base would require 1,324 housing units to house current and reasonably foreseeable future personnel. Demolition of the old MFH and subsequent construction of the new MFH would result in a net increase of 21 housing units within the Phase 8 area. Any surplus MFH would provide room for growth of base personnel in the reasonably foreseeable future.

Employment and Earnings

The Proposed Action would result in short-term beneficial impacts to employment and earnings for some of the residents of the MHAFB or Elmore County. An estimated 6.0 percent of the employed civilian population in Elmore County is classified as a construction worker, and Phase 8 implementation could draw heavily from this segment of the labor force (USCB 2005). The average wage of a construction worker in Elmore County is \$33,280 (IDL 2001). Assuming that 300 construction workers would be employed during the duration of Phase 8 implementation, the total salary for construction workers would reach almost \$10,000,000/year. Since a significant portion of the necessary workers would likely move, at least temporarily, to Elmore County from somewhere else, the local housing market would experience a boost. And because a majority of the construction materials would be purchased locally, and because a majority of the construction salary total would be spent on local goods and services, the local business community would also experience a boost.

Although 21 additional housing units would be built under the Proposed Action than currently exist in Phase 8, it is assumed that the number of personnel needed for maintenance and management duties would remain the same under this action, resulting in no net increase or decrease in long-term jobs in the county.

4.10.2 Alternative Actions

Under the Alternative Actions for the Senior Officers' Quarters, impacts to population, housing, and employment and earnings would be similar to that of the Proposed Action for the Senior Officers' Quarters.

4.10.3 No Action Alternative

Under the No Action Alternative, the existing MFH would not be replaced with new MFH and the existing Senior Officers' Quarters would not be demolished. Personnel currently living in the existing MFH and Senior Officers' Quarters would continue to live in deteriorating housing that does not meet current USAF housing standards or the USAF whole-house/whole-neighborhood philosophy. In addition, continued habitation of the existing MFH could contribute to low morale and impact the retention of qualified personnel, which could lead to a decrease in the population of MHAFB. There would be no short-term economic benefit to Elmore County in the event that the proposed MFH is not constructed. Accordingly, the No



Action Alternative would result in continued long-term negative impacts to base housing and no beneficial impact to MHAFB population and employment and earnings for residents of Elmore County.

4.11 ENVIRONMENTAL JUSTICE

4.11.1 Proposed Action

The Proposed Action is limited to activities that would occur within the confines of the MHAFB. Accordingly, there would be no adverse impacts to minority or low-income populations.

4.11.2 Alternative Actions

Under the Alternative Actions for the Senior Officers' Quarters, impacts to minority or low-income populations would be similar to that of the Proposed Action for the Senior Officers' Quarters.

4.11.3 No Action Alternative

Under the No Action Alternative, there would be no change in current conditions at MHAFB and no adverse impacts to minority or low-income populations.

4.12 CUMULATIVE EFFECTS

This section provides a definition of cumulative effects; a description of past, present, and reasonably foreseeable actions; and, an analysis of cumulative effects potentially resulting from these interactions.

4.12.1 Definition of Cumulative Effects

CEQ regulations mandate that the cumulative effects analysis of an EA should consider the potential environmental impacts resulting from “the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such actions” (40 CFR 1508.7). CEQ Guidance on the Consideration of Past Actions in Cumulative Effects Analysis affirms this requirement by stating that “scoping should be used to focus the extent to which information is relevant to reasonably foreseeable significant adverse impacts is essential to a reasoned choice among alternatives, and can be obtained without exorbitant cost” (CEQ 2005). This scoping must consider the geographic and temporal overlaps among the Proposed Action and other actions. The scope must also consider the nature of interactions among these actions.

Cumulative impacts are most likely to occur when a relationship exists between a Proposed Action and other actions that are expected to occur within a similar location and time. Actions that overlap or have a close proximity to one another are more likely to have a synergistic effect than actions separated by geography and time.



4.12.2 Past, Present, and Reasonably Foreseeable Actions

The MHAFB is a dynamic military installation that undergoes continuous changes in mission and training requirements. This process of change is consistent with the United States defense policy that the Air Force must be ready to respond to threats to American interests throughout the world. In 2002 the USAF implemented a force structure change that included removal of six B-1 aircraft and six operational KC-135 aircraft that decreased personnel by 729 and added six operational F-15 aircraft and 151 personnel, for a cumulative loss of six aircraft and 578 personnel. Additional past and present actions carried forth by the MHAFB include earlier phases of the MFH replacement project and several smaller actions. Examples of these smaller actions include the Veterinary Clinic and Military Working Dog Kennel (USAF ACC 2003a) and the Improvements to Irrigation System and Land Application of Treated Wastewater Effluent at Existing Golf Course (USAF ACC 2003b) projects conducted in 2003. The base also requires occasional new construction, facility improvements, and infrastructure upgrades (USAF ACC 2003b).

Reasonably foreseeable actions include completion of the planned MFH. These actions would be implemented irrespective of a decision on the proposed standard housing units and the Senior Officers' Quarters.

4.12.3 Analysis of Cumulative Effects

The following analysis examines how the impacts of other planned actions at MHAFB might be affected by those resulting from the Proposed Action. It further examines these cumulative impacts to determine whether the Proposed Action plus other planned actions would have a synergistic effect and result in significant impacts not identified when the Proposed Action is considered alone.

Recently, the MHAFB adopted a structure change that left the base operating at levels below those occurring in the late 1990's. The EA for this structure change did not identify any significant environmental impacts (USAF ACC 2002). Additionally, several housing improvements and minor infrastructure upgrades have been implemented at MHAFB with no significant environmental consequences.

Although Wyoming big sagebrush would be impacted by the implementation of Phase 8 MFH, only 0.6 acres would be converted to developed land. Even in the context of regional loss of this community type, and regional awareness regarding its importance, 0.6 acre of the 380 acres Wyoming big sagebrush on MHAFB would not tip the cumulative effects balance for this native plant community.

With the exception of one additional smaller housing development currently in the planning phase, Phase 8 is the last large housing redevelopment project planned for the foreseeable future. Cumulative impacts from the Proposed Action and the impacts from planned actions would remain well below the threshold of significance for any resource category.



4.13 IRRETRIEVABLE AND IRREVERSIBLE COMMITMENTS OF RESOURCES

NEPA requires that environmental analysis include the identification of “...any irreversible and irretrievable commitments of resources which would be involved in the Proposed Action should it be implemented.” Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects the use of these resources would have on consumption or destruction of a resource that could not be replaced in a reasonable period of time. The irreversible commitment of resources that would result from implementation of the Proposed Action includes the consumption of material resources, energy resources, and human resources. Material resources used for the Proposed Action would include building materials and fuel. The materials that would be consumed are not in short supply and are readily available from suppliers in the region. Use of these materials would not limit other unrelated construction activities. Therefore, such use would not be considered significant.

The development of previously undeveloped land would be an essentially irreversible impact on the environment. The Proposed Action would convert 10.18 acres of open space into a residential community. Based on the amount of open space that would be converted and the amount of open space in the region, this conversion would not be considered a significant negative impact.

Some energy resources would be irretrievably lost. These include petroleum-based products such as gasoline and diesel fuel and electricity. Consumption of these energy resources would not place an unreasonable demand on their availability in the region. Therefore, no significant impacts would be expected.

The use of human resources for construction is considered an irretrievable loss, only in that it would preclude such personnel from engaging in other work activities. However, the use of human resources for the Proposed Action represents employment opportunities, and is considered beneficial for the regional local economy.



5.0 SUMMARY AND CONCLUSIONS

5.1 PROPOSED ACTION

One of the benefits provided to all USAF personnel is the guarantee of suitable living quarters, either on base or in a nearby off-base location. Currently, much of the housing constructed in the late 1950s at MHAFB does not meet current USAF housing standards, or consists of housing units that are structurally deteriorated beyond economical repair. Accordingly, MHAFB has implemented a phased approach to replace the deteriorated housing with new, modern, and appealing housing units.

Implementation of the Proposed Action would provide several long-term beneficial impacts to MHAFB while minimizing adverse impacts to the environment. These benefits include new housing that:

- provides new, efficient homes that meet current housing standards;
- meets the USAF whole house/whole neighborhood philosophy; and,
- eliminates ACM and LBP concerns in current housing.

However, the Proposed Action would also result in the demolition of three historic structures. Before Phase 8 could move forward, HABS documentation would be required on all three Senior Officers' Quarters, per Section 106 of the NHPA of 1966. The HABS process is designed to produce high quality documentation of a building prior to demolition. HABS documentation would record the houses, their construction, and their setting. Since each Senior Officers' Quarters is significant on a state and national level, all three potential levels of HABS documentation would need to be performed on all three buildings.

5.2 ALTERNATIVE ACTIONS

The Alternative Actions identified and carried forward in this EA include two options for relocating one of the Senior Officers' Quarters on base (Figure 4) and one option for donating one or more of the Senior Officers' Quarters. Although MFH could be successfully implemented utilizing any of these alternatives, the cost of implementing Alternatives 1 or 2 appears prohibitive due to the combined cost of relocating and rehabilitating a structure for an adaptive new use as well as conducting HABS on the two structures that would be demolished (Table 4; Appendix D). And in regard to the donation option, at this point a willing new owner for the structures has not been identified.

If budget considerations allowed for the transport and reuse of one of the structures, Alternative 1 (Visitor Welcome Center at the Front Gate) would be environmentally preferred since it would allow for the preservation and public use of one of the Senior Officers' Quarters, albeit outside of the Wherry-Capehart footprint. Demolition or donation of the buildings would eliminate the last Neutra structures from the entire state of Idaho as well as eliminate any presence of Neutra's work from the USAF. The main entrance to MHAFB would be an ideal showplace for one of



the Senior Officers' Quarters, and the interior of the structures lend themselves to a combination of public and office use.

Relocation of one of the Senior Officer's Quarters to Heritage Park for Laboratory and Office Space is considered an acceptable but not preferred alternative to the Proposed Action. Although Heritage Park is physically closer to the existing location of the Senior Officers' Quarters, its location in the central portion of the base would limit interaction with the public. If the need for laboratory and office space on MHAFB were urgent and pressing, that could alter the availability of funds for relocating a structure for that purpose.

5.3 ANTICIPATED ENVIRONMENTAL EFFECTS

Most of the anticipated environmental effects would be minor, short-term, unavoidable negative impacts. These include temporary disturbance to soils, vegetation, and common wildlife species during construction activities. Noise and air resource impacts would be limited to the duration of active construction activities. Additionally, there would be minor permanent impacts to resources such as landfill capacity and water consumption/wastewater production. The current design of the existing on-base landfill, water supply, and wastewater treatment systems are sufficient to meeting the additional demand required by the new housing units.

However, there would be an adverse effect to cultural and historical resources in the form of the demolition of the Senior Officers' Quarters.

5.4 MITIGATION MEASURES

Before the Proposed Action could be implemented, HABS would have to be completed on each of the three Senior Officers' Quarters. HABS recordation would record the houses, their construction, and their setting. The required level of recordation would be determined by a review of the project by the National Park Service in consultation with the Idaho SHPO, but since each Senior Officers' Quarters is historically significant on a state and national level, all three levels of documentation would need to be performed on all three buildings. It is also likely that a lengthy Section 106 process would result from implementing the Proposed Action.

In the case of each of the three Senior Officers' Quarters, the first level of HABS recordation would include a written historical report comprised of primary and secondary resources, such as oral histories of previous occupants, written histories of MHAFB, construction and maintenance records, and legal information [per Programmatic Comment]. The second level of documentation would include black and white, large format photographs derived from 4 x 5 or 8 x 10 inch negatives of each of the three buildings. The photographs would be archivally stable, perspective corrective, high quality prints. The third level of documentation would involve on-site recordation of each of the three buildings, including all exterior and interior aspects and important details.

An important aspect of the documentation would be a site plan depicting landscaping and built elements associated with each building (e.g., patios, fencing, oasis walls). The construction and



current character of each building would be described by utilizing floor plans, exterior elevations, wall sections, and details. The measurements of these items for each building would be used to prepare finished drawings. Historically, these drawings were produced using pen and ink on archival quality paper; now computer-aided drafting (CAD) systems are utilized. Other items that could be part of the final HABS package include reproductions of historical photos, original drawings, and taped interviews. After the National Park Service approved all levels of documentation, the entire package would be deposited at the Library of Congress. Detailed cost estimates for a three-level recordation of each structure are located in Table 2.

Several other mitigation measures would be implemented to minimize potential impacts to environmental resources as a result of the Proposed Action. These mitigation measures include soil and water conservation measures, pre-construction monitoring for special concern species, habitat restoration, air quality controls, and historic structure protection measures. These mitigation measures would be implemented under the direction and guidance of MHAFFB's Integrated Management Plan where specific conservation, restoration and mitigation initiatives are outlined for long-term management of the MHAFFB.

During construction activities, the contractor would be required to implement BMPs for erosion control and soil and water conservation. Some of these mitigation measures include minimization of soil disturbance, installation of soil erosion barriers (i.e., silt fences, staked hay bales), and seeding exposed soil to promote vegetation growth. In the event of a hazardous materials spill, procedures in the *MHAFFB Fighter Wing Plan 3209-04 Emergency Planning and Response Plan* would be implemented immediately to protect ground and surface waters.

Temporary impacts to wildlife from construction activities would be minimized and mitigated by post construction activities. Prior to construction, MHAFFB would survey construction zones for potential burrowing owl burrows. Newly planted trees, shrubs, and grassy areas would provide habitat for bird species displaced during construction activities, such as house finches, American robins, killdeer, western meadowlarks, grackles and starlings. Additionally, the vegetation would provide aesthetic appeal, visual screening, and protection from strong desert winds.

Impacts to air quality and noise sensitive receptors would be addressed. Specific mitigation measures include spraying water on exposed soil to minimize fugitive dust; requiring contractors to utilize properly maintained machinery, including implementation of appropriate noise mufflers; and limiting prolonged and unnecessary idling of construction equipment.

5.5 CONCLUSION

MHAFFB is committed to providing safe, modern, and efficient housing for personnel serving at the base. Implementation of the Proposed Action would meet the purpose and need for Phase 8 of MFH at MHAFFB. Several alternative scenarios were investigated, and although they equally met the purpose and need of the project as well as the Proposed Action, they were cost prohibitive. Although there would be impacts to environmental and historic resources, with the exception of the Senior Officers' Quarters, these impacts would be minor and temporary in nature. Although each of the Senior Officers' Quarters are eligible for listing with the NRHP,



and are thus considered significant historic resources per the NHPA, the demolition of the structures after completion of the required mitigation does not elevate the impacts to the level of significant per NEPA. In addition, MHAFB and the construction contractor would implement actions to minimize and mitigate for impacts caused by construction of Phase 8. Accordingly, the Proposed Action would meet the purpose and need of Phase 8 of MFH at MHAFB without causing undue significant negative impacts to existing environmental, cultural, or historical resources.



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APPENDIX A

ANIMAL SPECIES RECORDED ON MHAFB

Species Recorded on MHAFB

		<u>G Rank*</u>	<u>S Rank*</u>	<u>State</u> <u>Classification†</u>	<u>Elmore</u> <u>County**</u>
Desert Horned Lizard (<i>Phrynosoma platyrhinos</i>)	1 Phrynosomatidae	G5	S4	Protected	
Western Fence Lizard (<i>Sceloporus occidentalis</i>)	1 Phrynosomatidae	G5	S4	Protected	
Sagebrush Lizard (<i>Sceloporus graciosus</i>)	10 Phrynosomatidae	G5	S5	Protected	
Great Basin Gopher Snake (<i>Pituophis catenifer deserticola</i>)	1 Colubridae	G5	S5	Protected	
Common Gartersnake (<i>Thamnophis sirtalis</i>)	1 Colubridae	G5	S5	Protected	
Western Rattlesnake (<i>Crotalus viridis</i>)	1 Viperidae	G5	SNR	Protected	
California Gull (<i>Larus californicus</i>)	10 Laridae	G5	S2	Protected	Special Status
American White Pelican (<i>Pelecanus erythrorhynchos</i>)	1 Pelecanidae	G3	S1	Protected	Special Status
Mallard (<i>Anas platyrhynchos</i>)	106 Anatidae	G5	S5	Game	
Gadwall (<i>Anas strepera</i>)	2 Anatidae	G5	S5	Game	American
Wigeon (<i>Anas americana</i>)	1 Anatidae	G5	S5	Game	
Blue-winged Teal (<i>Anas discors</i>)	1 Anatidae	G5	S5	Game	
Cinnamon Teal (<i>Anas cyanoptera</i>)	1 Anatidae	G5	S5	Game	
Northern Shoveler (<i>Anas clypeata</i>)	3 Anatidae	G5	S5	Game	
Redhead (<i>Aythya americana</i>)	1 Anatidae	G5	S5	Game	
Common Goldeneye (<i>Bucephala clangula</i>)	25 Anatidae	G5	S3	Game	
Bufflehead (<i>Bucephala albeola</i>)	10 Anatidae	G5	S3	Game	
Ruddy Duck (<i>Oxyura jamaicensis</i>)	2 Anatidae	G5	S5	Game	
Canada Goose (<i>Branta canadensis</i>)	2 Anatidae	G5	S5	Game	
Tundra Swan (<i>Cygnus columbianus</i>)	4 Anatidae	G5		Protected	
American Coot (<i>Fulica americana</i>)	2 Rallidae	G5	S5	Game	
Wilson's Phalarope (<i>Phalaropus tricolor</i>)	21 Scolopacidae	G5	S4	Protected	
American Avocet (<i>Recurvirostra americana</i>)	2 Recurvirostrida	G5	S5	Protected	
Spotted Sandpiper (<i>Actitis macularius</i>)	25 Scolopacidae	G5	S5	Protected	
Long-billed Curlew (<i>Numenius americanus</i>)	4 Scolopacidae	G5	S3	Protected	Special Status
Killdeer (<i>Charadrius vociferus</i>)	114 Charadriidae	G5		Protected	
California Quail (<i>Callipepla californica</i>)	382 Odontophoridae	G5	Exotic	Game/Not Native	
Ring-necked Pheasant (<i>Phasianus colchicus</i>)	6 Phasianidae	G5	Exotic	Game/Not Native	
Rock Dove (<i>Columba livia</i>)	5 Columbidae	G5	Exotic	Not Native	
Mourning Dove (<i>Zenaida macroura</i>)	148 Columbidae	G5	S5	Game	
Turkey Vulture (<i>Cathartes aura</i>)	1 Cathartidae	G5	S4	Protected	
Northern Harrier (<i>Circus cyaneus</i>)	18 Accipitridae	G5	S5	Protected	
Red-tailed Hawk (<i>Buteo jamaicensis</i>)	4 Accipitridae	G5	S5	Protected	
Swainson's Hawk (<i>Buteo swainsoni</i>)	1 Accipitridae	G5	S4	Protected	
Rough-legged Hawk (<i>Buteo lagopus</i>)	11 Accipitridae	G5		Protected	
Prairie Falcon (<i>Falco mexicanus</i>)	4 Falconidae	G5	S5	Protected	
American Kestrel (<i>Falco sparverius</i>)	25 Falconidae	G5	S5	Protected	
Barn Owl (<i>Tyto alba</i>)	4 Tytonidae	G5	S3	Protected	
Short-eared Owl (<i>Asio flammeus</i>)	1 Strigidae	G5	S5	Protected	
Great Horned Owl (<i>Bubo virginianus</i>)	3 Strigidae	G5	S5	Protected	
Western Burrowing Owl (<i>Athene cunicularia hypugaea</i>)	32 Strigidae	G4T4	S3	Protected	Special Status
Northern Flicker (<i>Colaptes auratus</i>)	9 Picidae	G5	S5	Protected	
Common Nighthawk (<i>Chordeiles minor</i>)	22 Caprimulgidae	G5	S5	Protected	
Ruby-throated Hummingbird (<i>Archilochus colubris</i>)	1 Trochilidae	G5		Protected	
Black-chinned Hummingbird (<i>Archilochus alexandri</i>)	298 Trochilidae	G5	S5	Protected	
Broad-tailed Hummingbird (<i>Selasphorus platycercus</i>)	1 Trochilidae	G5	S5	Protected	
Rufous Hummingbird (<i>Selasphorus rufus</i>)	118 Trochilidae	G5	S5	Protected	
Calliope Hummingbird (<i>Stellula calliope</i>)	65 Trochilidae	G5	S5	Protected	
Western Kingbird (<i>Tyrannus verticalis</i>)	12 Tyrannidae	G5	S5	Protected	
Hammond's Flycatcher (<i>Empidonax hammondi</i>)	1 Tyrannidae	G5	S5	Protected	
Horned Lark (<i>Eremophila alpestris</i>)	229 Alaudidae	G5	S5	Protected	
Black-billed Magpie (<i>Pica hudsonia</i>)	175 Corvidae	G5	S5	Protected	

Common Raven (<i>Corvus corax</i>)	383	Corvidae	G5	S5	Protected	
American Crow (<i>Corvus brachyrhynchos</i>)	48	Corvidae	G5	S5	Game	
European Starling (<i>Sturnus vulgaris</i>)	994	Sturnidae	G5	Exotic	Predator/Not Native	
Bullock's Oriole (<i>Icterus bullockii</i>)	1	Icterinae	G5	S5	Protected	
Brown-headed Cowbird (<i>Molothrus ater</i>)	10	Icterinae	G5	S5	Protected	
Yellow-headed Blackbird (<i>Xanthocephalus xanthocephalus</i>)	11	Icterinae	G5	S5	Protected	
Western Meadowlark (<i>Sturnella neglecta</i>)	118	Icterinae	G5	S5	Protected	
Brewer's Blackbird (<i>Euphagus cyanocephalus</i>)	16	Icterinae	G5	S4	Protected	
House Finch (<i>Carpodacus mexicanus</i>)	116	Fringillidae	G5	S5	Protected	
American Goldfinch (<i>Carduelis tristis</i>)	22	Fringillidae	G5	S5	Protected	
Pine Siskin (<i>Carduelis pinus</i>)	69	Fringillidae	G5	S5	Protected	
Vesper Sparrow (<i>Poocetes gramineus</i>)	3	Emberizidae	G5	S4	Protected	
White-crowned Sparrow (<i>Zonotrichia leucophrys</i>)	26	Emberizidae	G5	S5	Protected	
Brewer's Sparrow (<i>Spizella breweri</i>)	18	Emberizidae	G5	S4	Protected	
Dark-eyed Junco (<i>Junco hyemalis</i>)	101	Emberizidae	G5	S5	Protected	
Sage Sparrow (<i>Amphispiza belli</i>)	2	Emberizidae	G5	S4	Protected	
Black-headed Grosbeak (<i>Pheucticus melanocephalus</i>)	2	Fringillidae	G5	S5	Protected	
Lazuli Bunting (<i>Passerina amoena</i>)	1	Emberizidae	G5	S5	Protected	
Western Tanager (<i>Piranga ludoviciana</i>)	26	Thraupidae	G5	S5	Protected	
Barn Swallow (<i>Hirundo rustica</i>)	194	Hirundinidae	G5	S5	Protected	
Bank Swallow (<i>Riparia riparia</i>)	140	Hirundinidae	G5	S5	Protected	
Cedar Waxwing (<i>Bombycilla cedrorum</i>)	20	Bombycillidae	G5	S5	Protected	
Loggerhead Shrike (<i>Lanius ludovicianus</i>)	7	Laniidae	G4	S3	Protected	Special Status
Yellow Warbler (<i>Dendroica petechia</i>)	3	Parulidae	G5	S5	Protected	
House Sparrow (<i>Passer domesticus</i>)	60	Passeridae	G5	Exotic	Not Native	
Sage Thrasher (<i>Oreoscoptes montanus</i>)	10	Mimidae	G5	S5	Protected	
Rock Wren (<i>Salpinctes obsoletus</i>)	16	Troglodytidae	G5	S5	Protected	
Red-breasted Nuthatch (<i>Sitta canadensis</i>)	3	Sitidae	G5	S5	Protected	
Black-capped Chickadee (<i>Poecile atricapillus</i>)	7	Paridae	G5	S5	Protected	
Mountain Chickadee (<i>Poecile gambeli</i>)	2	Paridae	G5	S5	Protected	
American Robin (<i>Turdus migratorius</i>)	170	Turdidae	G5	S5	Protected	
Mountain Cottontail (<i>Sylvilagus nuttallii</i>)	79	Leporidae	G5	S5	Game	
Black-tailed Jackrabbit (<i>Lepus californicus</i>)	28	Leporidae	G5	S5	Predator	
Feral Rabbit (<i>Oryctolagus cuniculus</i>)	12	Leporidae				
Piute Ground Squirrel (<i>Spermophilus mollis</i>)	74	Sciuridae	G5	SNR	Protected	
Ord's Kangaroo Rat (<i>Dipodomys ordii</i>)	2	Heteromyidae	G5	S5		
Desert Woodrat (<i>Neotoma lepida</i>)	1	Muridae	G5	S4		
Yuma Myotis (<i>Myotis yumanensis</i>)	1	Vespertilionidae	G5	S3	Protected	Special Status
Silver-haired Bat (<i>Lasionycteris noctivagans</i>)	1	Vespertilionidae	G5	S4	Protected	
Coyote (<i>Canis latrans</i>)	21	Canidae	G5	S5	Predator	
American Badger (<i>Taxidea taxus</i>)	18	Mephitidae	G5	S5	Game	
Mule Deer (<i>Odocoileus hemionus</i>)	1	Cervidae	G5	S5	Game	
94 Total Identified Species	Total Recorded: 4,755 47 Families					

* See Appendix 2: NatureServe Conservation Status

** See IDFG 2006

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See State of Idaho (2006) for definitions

APPENDIX B

ARCHITECTURAL CONDITIONS SURVEY OF THE SENIOR OFFICERS' QUARTERS

Architectural Conditions Survey of the Senior Officer's Quarters

General's Residence – Building #4478

Walls – Construction of the General's residence generally appears to be as per the original 1958 plans. The end walls of each residence are specified as "Brick Block" - a jumbo brick. It is assumed that they are two wythes or two brick blocks in thickness with no cavity space for insulation. There are no openings in the masonry wall at the master bedroom suite. A similar treatment occurs at the opposite end wall, at the garage. This thick brick wall wraps around the corner and comprises the back wall of the garage as well. A small area of this masonry wall is interrupted on the end wall where wood framing from foundation to roof provides for a window to illuminate the garage.

The remaining wall systems, both exterior and interior, are of wood frame construction, either 2 x 4 or 2 x 6, depending upon the bearing. At the exterior, they are finished with ½ inch (in.) sheathing and 1 x 4 tongue and groove vertical wood siding. It is unknown if the siding has lead-based paint present within the original layers of paint. These wood frame walls meet the brick block walls of the garage and the master bedroom suite. It is unknown whether there is insulation in the walls, or if so how much. At the interior, all walls are assumed finished with ½" gypsum board as per the 1958 plans.

A notable wall modification in the General's residence is that the original opening between the living room and guest bedroom has been infilled with wall. Originally, the guest room had a moveable wall divider to make the room private or keep it open to connect it to the living room. The addition of this wall clearly defines the two rooms.

Roof and Ceilings – According to the plans the roof deck construction at the bedroom areas, entry, and kitchen are 2 x 10s at 16 in. on center (o. c.) At the higher roof, above the living/dining room and the garage, 2 x 12 at 16 in. o. c. were utilized. It is assumed the nearly flat roof is finished with a built-up roofing product. The soffits and eaves are defined in metal. A rainwater system of metal gutters and downspouts occurs over doorways.

The ceilings vary in height depending upon the function of the space. The long hallway leading to the bedrooms has a ceiling of seven feet high otherwise the ceilings at the bedrooms and kitchen are eight feet in height. The exception is at the living/dining room where a height of ten feet provides a loftier space. At the intervening wall between the kitchen and living/dining room is a lowered light trough at eight feet high and four feet deep along which is located fluorescent light tubes that illuminate the higher ceiling the whole length of the living/dining room. All ceilings are assumed to be finished with ½ in. gypsum board and painted as specified on the 1958 drawings. Again, it is unknown as to whether there is insulation in the roof/ceiling space, or if so how much.

Windows and Doors – The fenestration is a combination of single pane fixed glass and metal (aluminum) sliding sash, and some replacement windows have been installed. The windows span from wall to wall within rooms, providing bands of glass and wide views of the outdoors.

Intermittent posts provide structural stability at long bands of windows. Although some exterior doors have been replaced with more modern doors over the life of the house, most appear to be solid core slab doors. Some of the exterior doors have aluminum storm doors.

Interior Finishes – The floor finishes vary throughout the residence. Generally, carpeting occurs in the living/dining room, bedrooms, and hallway. The kitchen is finished in sheet vinyl and bathrooms have ceramic tile at the tub/shower walls and floor. At the main foyer wood parquet flooring enhances the entry and it may be original.

All the walls, unless otherwise mentioned, are finished in gypsum board with a smooth surface and painted. Interior doors appear to be original hollow core wood, single leaf or sliding as at the closets. The kitchen has been updated with modern cabinetry; base and upper cabinets are wood with plastic laminate countertops. Trim throughout the residence is minimal, creating a clean, smooth surface from room to room. Doors and windows lack casings, thereby emphasizing the clean simplicity of the interior. The exception is the wood baseboards and windowsills.

Mechanical, Electrical, and Communications Systems – The mechanical room is located at the exterior adjacent to the front entry. The furnace is a gas forced air system with floor registers at the perimeter of all rooms. The return grilles are located at the upper walls and at the dropped ceiling of the hallway. An air conditioning condenser is located at the exterior. It is speculated that there is either a trench system for ductwork and piping beneath the slab or it may simply be buried beneath the slab. Probably the latter is correct as conversations about plumbing repairs indicate the use of a jack hammered to demolish the concrete slab to make repairs, and then the concrete floor was patched.

It is assumed that the water source and sewer system is MHAFB utilities. From a plumbing standpoint, again, piping is beneath the concrete slab. In the master bath there is a large shower stall, a toilet, a sink, but no bathtub. A full bathroom containing a tub/shower, toilet, and sink is located off the hallway. A half bath off the kitchen has a toilet and sink. It should be noted that some of these fixtures may be original.

The electrical meter is located at the exterior wall near the garage door. It is unknown as to its most recent updating. Considering there is no crawl space or attic, electrical modifications have occurred via surface mounted conduit at the exterior. Original cloth-coated, non-metallic wiring was, however, observed in the garage.

An interesting detail throughout the interior of the residence is the wall outlets that are installed horizontally. This lends to the horizontality of the entire design of the house: one story height, the long bands of windows, and low rooflines. Unfortunately, the receptacles do not exhibit a ground wire, which could be the condition throughout the house.

Some of the lighting fixtures have been changed over the years, including brass and glass chandeliers at eating areas, wall sconces at bedrooms, recessed can lights at the hallway, and boxy fluorescent fixtures at the kitchen fixtures that do not blend with the design of the house.

The only original lighting appears to be the fluorescent tubing at the ceiling trough above the living/dining room, which accentuates the higher ceiling.

The communication system consists of telephone and cable wiring, mounted at the exterior. Additionally a satellite dish is located at the rear yard.

Site and Landscaping – The site amenities at the General's residence include a semi circular driveway bordered with a concrete sidewalk at the front of the residence. A concrete sidewalk leads to the front door. Landscaping was planned in two ways. First, an "oasis wall" or screen wall about five feet in height, constructed of brick block, was used to create a private courtyard in the front of the house, accessible from the kitchen and via a gate. This private courtyard provided an enclosed play yard for children visible from the band of windows at the kitchen. Second, the living and dining rooms opened onto a long, narrow patio that is sheltered with a deep overhang. To create a greater shaded area, a metal canopy was added. A large rear yard provides landscaped space for entertaining. The landscaping around the residence consists of mature trees, shrubbery, planting beds, and lawn areas. A wood frame fence surrounds the rear yard creating a large private space.

Commander's Residence – Building #4473

Walls – Construction of the Commander's residence generally appears to be as per the original 1958 plans. The end walls of each residence are specified as "Brick Block" - a jumbo brick. It is assumed they are two wythes or two brick blocks in thickness with no cavity space for insulation. There are no openings in the masonry wall at the master bedroom suite. A similar treatment occurs at the opposite end wall, at the garage. This thick brick wall wraps around the corner and comprises the back wall of the garage as well. A small area of this masonry wall is interrupted on the end wall where wood framing from foundation to roof provides for a window to illuminate the garage.

The remaining wall systems, both exterior and interior are of wood frame construction, either 2 x 4 or 2 x 6, depending upon the bearing. At the exterior, they are finished with ½ inch (in.) sheathing and 1 x 4 tongue and groove vertical wood siding. It is unknown if the siding has lead-based paint present within the original layers of paint. These wood frame walls meet the brick block walls of the garage and the master bedroom suite. It is unknown whether there is insulation in the walls, or if so how much. At the interior, all walls are assumed finished with ½" gypsum board as per the 1958 plans.

There are four notable wall modifications in the Commander's residence. The first is that the original opening between the living room and guest bedroom has been infilled with wall. Originally, the guest room had a moveable wall divider to make the room private or keep it open to connect it to the living room. The addition of this wall clearly defines the two rooms.

Secondly, the opening between the living room and dining room has been widened, giving less formality to the dining room. Third, the definition between the kitchen and eating area has been altered. A wall with a door was added at the north end of the kitchen to separate the eating area.

A fourth, another wall was added between the eating area and the living room with an angled opening off the foyer.

Roof and Ceilings – According to the plans the roof deck construction at the bedroom areas, entry, and kitchen are 2 x 10s at 16 in. on center (o. c.) At the higher roof, above the living/dining room and the garage, 2 x 12 at 16 in. o. c. were utilized. It is assumed the nearly flat roof is finished with a built-up roofing product. The soffits and eaves are defined in metal. A rainwater system of metal gutters and downspouts occurs over doorways.

The ceilings vary in height depending upon the function of the space. The long hallway leading to the bedrooms has a ceiling of seven feet high otherwise the ceilings at the bedrooms and kitchen are eight feet in height. The exception is at the living/dining room where a height of ten feet provides a loftier space. At the intervening wall between the kitchen and living/dining room is a lowered light trough at eight feet high and four feet deep along which is located fluorescent light tubes that illuminate the higher ceiling the whole length of the living/dining room. All ceilings are assumed to be finished with ½ in. gypsum board and painted as specified on the 1958 drawings. Again, it is unknown as to whether there is insulation in the roof/ceiling space, or if so how much.

Windows and Doors – The fenestration is a combination of single pane fixed glass and metal (aluminum) sliding sash, and some replacement windows have been installed. The windows span from wall to wall within rooms, providing bands of glass and wide views of the outdoors. Intermittent posts provide structural stability at long bands of windows. Although some exterior doors have been replaced with more modern doors over the life of the house, most appear to be solid core slab doors. Some of the exterior doors have aluminum storm doors.

A major alteration to the fenestration at the Commander's residence occurs at the west elevation of the living/dining room. Four large fixed windows with pairs of awning windows below have been added in place of the long band of windows. Additionally, a pair of multi-paned French doors have been installed where the original single passage door was located at the living room.

Interior Finishes – The floor finishes vary throughout the residence. Generally, carpeting occurs in the living/dining room, bedrooms, and hallway. The kitchen is finished in sheet vinyl and bathrooms have ceramic tile at the tub/shower walls and floor.

All the walls, unless otherwise mentioned, are finished in gypsum board with a smooth surface and painted. Interior doors appear to be original hollow core wood, single leaf or sliding as at the closets. The kitchen has been updated with modern cabinetry; base and upper cabinets are wood with plastic laminate countertops. Trim throughout the residence is minimal, creating a clean, smooth surface from room to room. Doors and windows lack casings, thereby emphasizing the clean simplicity of the interior. The exception is the wood baseboards and windowsills.

Mechanical, Electrical, and Communications Systems – The mechanical room is located at the exterior adjacent to the front entry. The furnace is a gas forced air system with floor registers at the perimeter of all rooms. The return grilles are located at the upper walls and at the dropped

ceiling of the hallway. An air conditioning condenser is located at the exterior. It is speculated that there is either a trench system for ductwork and piping beneath the slab or it may simply be buried beneath the slab. Probably the latter is correct as conversations about plumbing repairs indicate the use of a jack hammered to demolish the concrete slab to make repairs, and then the concrete floor was patched.

It is assumed that the water source and sewer system is MHAFB utilities. From a plumbing standpoint, again, piping is beneath the concrete slab. In the master bath there is a large shower stall, a toilet, a sink, but no bathtub. A full bathroom containing a tub/shower, toilet, and sink is located off the hallway. A half bath off the kitchen has a toilet and sink. It should be noted that some of these fixtures may be original.

The electrical meter is located at the exterior wall near the garage door. It is unknown as to its most recent updating. Considering there is no crawl space or attic, electrical modifications have occurred via surface mounted conduit at the exterior. Original cloth-coated, non-metallic wiring was, however, observed in the garage.

An interesting detail throughout the interior of the residence is the wall outlets that are installed horizontally. This lends to the horizontality of the entire design of the house: one story height, the long bands of windows, and low rooflines. Unfortunately, the receptacles do not exhibit a ground wire, which could be the condition throughout the house.

Some of the lighting fixtures have been changed over the years, including brass and glass chandeliers at eating areas, wall sconces at bedrooms, recessed can lights at the hallway, and boxy fluorescent fixtures at the kitchen fixtures that do not blend with the design of the house. The only original lighting appears to be the fluorescent tubing at the ceiling trough above the living/dining room, which accentuates the higher ceiling.

The communication system consists of telephone and cable wiring, mounted at the exterior. Additionally a satellite dish is located at the rear yard.

Site and Landscaping – The site amenities at the Commander's residence include a semi circular driveway bordered with a concrete sidewalk at the front of the residence. A concrete sidewalk leads to the front door. Landscaping was planned in two ways. Originally, an "oasis wall" or screen wall about five feet in height, constructed of brick block, was used to create a private courtyard in the front of the house, accessible from the kitchen and via a gate. This private courtyard provided an enclosed play yard for children visible from the band of windows at the kitchen. This brick block wall has been removed and a wood fence installed in its place. Second, the living and dining rooms opened onto a long, narrow patio that is sheltered with a deep overhang. To create a greater shaded area, a metal canopy was added. A large rear yard provides landscaped space for entertaining. The landscaping around the residence consists of mature trees, shrubbery, planting beds, and lawn areas. A wood frame fence surrounds the rear yard creating a large private space.

Colonel's Residence – Building #4476

Walls – Construction of the Colonel's residence generally appears to be as per the original 1958 plans. The end walls of each residence are specified as "Brick Block" - a jumbo brick. It is assumed they are two wythes or two brick blocks in thickness with no cavity space for insulation. There are no openings in the masonry wall at the master bedroom suite. A similar treatment occurs at the opposite end wall, at the garage. This thick brick wall wraps around the corner and comprises the back wall of the garage as well. A small area of this masonry wall is interrupted on the end wall where wood framing from foundation to roof provides for a window to illuminate the garage.

The remaining wall systems, both exterior and interior are of wood frame construction, either 2 x 4 or 2 x 6, depending upon the bearing. At the exterior, they are finished with ½ inch (in.) sheathing and 1 x 4 tongue and groove vertical wood siding. It is unknown if the siding has lead-based paint present within the original layers of paint. These wood frame walls meet the brick block walls of the garage and the master bedroom suite. It is unknown whether there is insulation in the walls, or if so how much. At the interior, all walls are assumed finished with ½" gypsum board as per the 1958 plans.

Roof and Ceilings – According to the plans the roof deck construction at the bedroom areas, entry, and kitchen are 2 x 10s at 16 in. on center (o. c.) At the higher roof, above the living/dining room and the garage, 2 x 12 at 16 in. o. c. were utilized. It is assumed the nearly flat roof is finished with a built-up roofing product. The soffits and eaves are defined in metal. A rainwater system of metal gutters and downspouts occurs over doorways.

The ceilings vary in height depending upon the function of the space. The long hallway leading to the bedrooms has a ceiling of seven feet high otherwise the ceilings at the bedrooms and kitchen are eight feet in height. The exception is at the living/dining room where a height of ten feet provides a loftier space. At the intervening wall between the kitchen and living/dining room is a lowered light trough at eight feet high and four feet deep along which is located fluorescent light tubes that illuminate the higher ceiling the whole length of the living/dining room. All ceilings are assumed to be finished with ½ in. gypsum board and painted as specified on the 1958 drawings. Again, it is unknown as to whether there is insulation in the roof/ceiling space, or if so how much.

Windows and Doors – The fenestration is a combination of single pane fixed glass and metal (aluminum) sliding sash, and some replacement windows have been installed. The windows span from wall to wall within rooms, providing bands of glass and wide views of the outdoors. Intermittent posts provide structural stability at long bands of windows. Although some exterior doors have been replaced with more modern doors over the life of the house, most appear to be solid core slab doors. Some of the exterior doors have aluminum storm doors.

Interior Finishes – The floor finishes vary throughout the residence. Generally, carpeting occurs in the living/dining room, bedrooms, and hallway. The kitchen is finished in sheet vinyl and bathrooms have ceramic tile at the tub/shower walls and floor. At the main foyer wood parquet flooring enhances the entry and it may be original.

All the walls, unless otherwise mentioned, are finished in gypsum board with a smooth surface and painted. Interior doors appear to be original hollow core wood, single leaf or sliding as at the closets. The kitchen has been updated with modern cabinetry; base and upper cabinets are wood with plastic laminate countertops. Trim throughout the residence is minimal, creating a clean, smooth surface from room to room. Doors and windows lack casings, thereby emphasizing the clean simplicity of the interior. The exception is the wood baseboards and windowsills.

Mechanical, Electrical, and Communications Systems – The mechanical room is located at the exterior adjacent to the front entry. The furnace is a gas forced air system with floor registers at the perimeter of all rooms. The return grilles are located at the upper walls and at the dropped ceiling of the hallway. An air conditioning condenser is located at the exterior. It is speculated that there is either a trench system for ductwork and piping beneath the slab or it may simply be buried beneath the slab. Probably the latter is correct as conversations about plumbing repairs indicate the use of a jack hammered to demolish the concrete slab to make repairs, and then the concrete floor was patched.

It is assumed that the water source and sewer system is MHAFB utilities. From a plumbing standpoint, again, piping is beneath the concrete slab. In the master bath there is a large shower stall, a toilet, a sink, but no bathtub. A full bathroom containing a tub/shower, toilet, and sink is located off the hallway. A half bath off the kitchen has a toilet and sink. It should be noted that some of these fixtures may be original.

The electrical meter is located at the exterior wall near the garage door. It is unknown as to its most recent updating. Considering there is no crawl space or attic, electrical modifications have occurred via surface mounted conduit at the exterior. Original cloth-coated, non-metallic wiring was, however, observed in the garage.

An interesting detail throughout the interior of the residence is the wall outlets that are installed horizontally. This lends to the horizontality of the entire design of the house: one story height, the long bands of windows, and low rooflines. Unfortunately, the receptacles do not exhibit a ground wire, which could be the condition throughout the house.

Some of the lighting fixtures have been changed over the years, including brass and glass chandeliers at eating areas, wall sconces at bedrooms, recessed can lights at the hallway, and boxy fluorescent fixtures at the kitchen fixtures that do not blend with the design of the house. The only original lighting appears to be the fluorescent tubing at the ceiling trough above the living/dining room, which accentuates the higher ceiling.

The communication system consists of telephone and cable wiring, mounted at the exterior. Additionally a satellite dish is located at the rear yard.

Site and Landscaping – The site amenities at the Colonel's residence include a semi circular driveway bordered with a concrete sidewalk at the front of the residence. A concrete sidewalk leads to the front door. Landscaping was planned in two ways. First, an "oasis wall" or screen

wall about five feet in height, constructed of brick block, was used to create a private courtyard in the front of the house, accessible from the kitchen and via a gate. This private courtyard provided an enclosed play yard for children visible from the band of windows at the kitchen. Second, the living and dining rooms opened onto a long, narrow patio that is sheltered with a deep overhang. A large rear yard provides landscaped space for entertaining. The landscaping around the residence consists of mature trees, shrubbery, planting beds, and lawn areas. A wood frame fence surrounds the rear yard creating a large private space.

Structural System Assessment

Building # 4478 – General's Residence

Based on field observations, it is reasonable to conclude that the existing drawings accurately reflect the constructed features and that no major structural alterations have occurred.

Foundation System and Slab Floor – The foundation system continuously supports the perimeter of the main house, the interior bearing wall, and the perimeter of the garage. It is unknown how deep the foundation is, if it is reinforced, or if it has a thickened slab edge or an inverted tee system. The floor is a slab on grade system that rises one step up into the main house and one step down into the garage. It is believed that the slab floor was cut after the original construction was completed to accommodate a remodeled HVAC system, as the duct system is evident on all four sides along the perimeter of the main house. It appears that the concrete was cut and replaced in such a way as to allow no gap between the concrete and the duct work.

It is unlikely, and uncommon, that the concrete slab adds to the lateral system of the structure. If the footing system is an inverted tee style, then it was most likely designed without the added support from the slab. If the footing was designed as a thickened slab edge, then all load path continuity was compromised when the concrete was cut to allow for the installation of the remodeled HVAC system at the perimeter walls.

Roof – The roof is a flat, simply supported 2x framing system that cantilevers out for the roof overhang. One end of the roof framing is supported at an interior wall and the other end is supported at an exterior wall. There are two locations where the roof framing turns perpendicular to the typical framing layout. In both cases the framing was turned to allow for the cantilevered roof overhang and a minimal back span. The back span to cantilever span ratios range from approximately 1:1 to 2.7:1.

Walls – The exterior brick end walls are exposed and match the existing drawings. The exterior courtyard brick walls are of a double wythe construction and do not appear to leave a center cavity for reinforcement. The remaining exterior and interior walls are covered with architectural finish, but appear to be of 2 x 4 and 2 x 6 stud wall construction. The grade, quality, spacing, and attachment of the wood members, however, can not be confirmed without removing the existing finishing.

Lateral System – It is not clear from the existing drawings what the specific designed lateral system may have comprised. The drawings were prepared during a period when it was not common practice to design residential buildings to meet lateral load standards. It is possible that a lateral system does not exist beyond a bare minimum of resistance.

Shear Walls – The interior longitudinal wood framed bearing wall has too many offsets to be an efficient shear wall line. The exterior wood framed walls have too many long, continuous window and or door openings to provide any significant rigidity. The exterior brick walls are therefore the most likely candidates to resist the lateral shear loads. This theory is practically

supported by the fact that the roof diaphragm has at least one potentially qualifying brick wall located at each diaphragm boundary edge.

It is doubtful that the wood walls have any significant anchorage to the foundation. This observation is based on the theory that the wood walls are not shear walls. Only a single shot pin type connector was observed at the unfinished wood wall framing section in the garages of the two houses that were inspected.

Roof Diaphragm – The current adopted building code allows for a maximum wood roof diaphragm aspect ratio of 3:1, assuming the existing roof framing is unblocked at the sheathing edges. The largest of the three houses has a roof diaphragm aspect ratio of 3.4:1, which does not meet the current code minimum. The wood stud wall that runs between the garage and the main house, however, has a continuous footing underneath it and is the only wood framed wall with specific wall sheathing called out on the plan: “5/8” type ‘X’ gypsum board both sides”. This callout could support the theory that the exterior brick walls and only this one wood framed wall are the intended shear walls for the structure.

Building # 4473 – Commander’s Residence

Based on field observations, it is reasonable to conclude that the existing drawings accurately reflect the constructed features and that no major structural alterations have occurred.

Foundation System and Slab Floor – The foundation system continuously supports the perimeter of the main house, the interior bearing wall, and the perimeter of the garage. It is unknown how deep the foundation is, if it is reinforced, or if it has a thickened slab edge or an inverted tee system. The floor is a slab on grade system that rises one step up into the main house and one step down into the garage. It is believed that the slab floor was cut after the original construction was completed to accommodate a remodeled HVAC system, as the duct system is evident on all four sides along the perimeter of the main house. It appears that the concrete was cut and replaced in such a way as to allow no gap between the concrete and the duct work.

It is unlikely, and uncommon, that the concrete slab adds to the lateral system of the structure. If the footing system is an inverted tee style, then it was most likely designed without the added support from the slab. If the footing was designed as a thickened slab edge, then all load path continuity was compromised when the concrete was cut to allow for the installation of the remodeled HVAC system at the perimeter walls.

Roof – The roof is a flat, simply supported 2x framing system that cantilevers out for the roof overhang. One end of the roof framing is supported at an interior wall and the other end is supported at an exterior wall. There are two locations where the roof framing turns perpendicular to the typical framing layout. In both cases the framing was turned to allow for the cantilevered roof overhang and a minimal back span. The back span to cantilever span ratios range from approximately 1:1 to 2.7:1.

Walls – The exterior brick end walls are exposed and match the existing drawings. The exterior courtyard brick walls are of a double wythe construction and do not appear to leave a center

cavity for reinforcement. The remaining exterior and interior walls are covered with architectural finish, but appear to be of 2 x 4 and 2 x 6 stud wall construction. The grade, quality, spacing, and attachment of the wood members, however, can not be confirmed without removing the existing finishing.

Lateral System – It is not clear from the existing drawings what the specific designed lateral system may have comprised. The drawings were prepared during a period when it was not common practice to design residential buildings to meet lateral load standards. It is possible that a lateral system does not exist beyond a bare minimum of resistance.

Shear Walls – The interior longitudinal wood framed bearing wall has too many offsets to be an efficient shear wall line. The exterior wood framed walls have too many long, continuous window and or door openings to provide any significant rigidity. The exterior brick walls are therefore the most likely candidates to resist the lateral shear loads. This theory is practically supported by the fact that the roof diaphragm has at least one potentially qualifying brick wall located at each diaphragm boundary edge.

It is doubtful that the wood walls have any significant anchorage to the foundation. This observation is based on the theory that the wood walls are not shear walls. Only a single shot pin type connector was observed at the unfinished wood wall framing section in the garages of the two houses that were inspected.

Roof Diaphragm – The current adopted building code allows for a maximum wood roof diaphragm aspect ratio of 3:1, assuming the existing roof framing is unblocked at the sheathing edges. The largest of the three houses has a roof diaphragm aspect ratio of 3.4:1, which does not meet the current code minimum. The wood stud wall that runs between the garage and the main house, however, has a continuous footing underneath it and is the only wood framed wall with specific wall sheathing called out on the plan: “5/8” type ‘X’ gypsum board both sides”. This callout could support the theory that the exterior brick walls and only this one wood framed wall are the intended shear walls for the structure.

Building # 4476 – Colonel’s Residence

Based on field observations, it is reasonable to conclude that the existing drawings accurately reflect the constructed features and that no major structural alterations have occurred.

Foundation System and Slab Floor – The foundation system continuously supports the perimeter of the main house, the interior bearing wall, and the perimeter of the garage. It is unknown how deep the foundation is, if it is reinforced, or if it has a thickened slab edge or an inverted tee system. The floor is a slab on grade system that rises one step up into the main house and one step down into the garage. It is believed that the slab floor was cut after the original construction was completed to accommodate a remodeled HVAC system, as the duct system is evident on all four sides along the perimeter of the main house. It appears that the concrete was cut and replaced in such a way as to allow no gap between the concrete and the duct work.

It is unlikely, and uncommon, that the concrete slab adds to the lateral system of the structure. If the footing system is an inverted tee style, then it was most likely designed without the added support from the slab. If the footing was designed as a thickened slab edge, then all load path continuity was compromised when the concrete was cut to allow for the installation of the remodeled HVAC system at the perimeter walls.

Roof – The roof is a flat, simply supported 2x framing system that cantilevers out for the roof overhang. One end of the roof framing is supported at an interior wall and the other end is supported at an exterior wall. There are two locations where the roof framing turns perpendicular to the typical framing layout. In both cases the framing was turned to allow for the cantilevered roof overhang and a minimal back span. The back span to cantilever span ratios range from approximately 1:1 to 2.7:1.

Walls – The exterior brick end walls are exposed and match the existing drawings. The exterior courtyard brick walls are of a double wythe construction and do not appear to leave a center cavity for reinforcement. The remaining exterior and interior walls are covered with architectural finish, but appear to be of 2 x 4 and 2 x 6 stud wall construction. The grade, quality, spacing, and attachment of the wood members, however, can not be confirmed without removing the existing finishing.

Lateral System – It is not clear from the existing drawings what the specific designed lateral system may have comprised. The drawings were prepared during a period when it was not common practice to design residential buildings to meet lateral load standards. It is possible that a lateral system does not exist beyond a bare minimum of resistance.

Shear Walls – The interior longitudinal wood framed bearing wall has too many offsets to be an efficient shear wall line. The exterior wood framed walls have too many long, continuous window and or door openings to provide any significant rigidity. The exterior brick walls are therefore the most likely candidates to resist the lateral shear loads. This theory is practically supported by the fact that the roof diaphragm has at least one potentially qualifying brick wall located at each diaphragm boundary edge.

It is doubtful that the wood walls have any significant anchorage to the foundation. This observation is based on the theory that the wood walls are not shear walls. Only a single shot pin type connector was observed at the unfinished wood wall framing section in the garages of the two houses that were inspected.

Roof Diaphragm – The current adopted building code allows for a maximum wood roof diaphragm aspect ratio of 3:1, assuming the existing roof framing is unblocked at the sheathing edges. The largest of the three houses has a roof diaphragm aspect ratio of 3.4:1, which does not meet the current code minimum. The wood stud wall that runs between the garage and the main house, however, has a continuous footing underneath it and is the only wood framed wall with specific wall sheathing called out on the plan: “5/8” type ‘X’ gypsum board both sides”. This callout could support the theory that the exterior brick walls and only this one wood framed wall are the intended shear walls for the structure.

APPENDIX C

RELOCATION INFORMATION AND ESTIMATED COSTS

Relocation Information and Estimated Costs

The following sections describe activities related to relocating the Senior Officer's Quarters: pre-move preparation, three methods for moving the structures, post-move considerations, and cost estimates. Although it is possible to move any of the structures and maintain the structural integrity necessary to meet the minimum code requirements prescribed for historic structures, the moving process would impact them architecturally and structurally.

Pre-Move Preparation

During the architectural assessment, there did not appear to be any noticeable cracks in the interior wall and ceiling finish work, nor was there any evidence of uplift, settling, or other signs of distress in the concrete foundation. Therefore, it appears that the structural integrity of the houses is adequate and no structural repairs are required prior to moving.

Each method for moving the structures requires the removal of the existing exterior brick end walls. This becomes a structural concern if the exterior brick walls are indeed the main lateral load resisting system (i.e. shear walls). New wood framed walls would have to be built to replace the exterior brick walls for purposes of moving to support the structure's gravity and lateral loads. These walls should be designed and built to not just be temporary walls for moving, but as future shear walls at the new location.

It would be the sole responsibility of the moving contractor to reinforce, brace, and shore each structure in such a way that it can support itself during the entire moving process. This includes the process of detaching the structure from its current foundation, lifting the structure, transporting the structure to its future location, and lowering the structure onto its new foundation system.

In each method, prior to the moving operation, numerous preparation activities must occur. Since the floor slab is not being moved, all connections to the slab must be severed. The bathrooms must be demolished, whereby all plumbing fixtures need to be removed, all cabinetry secured to the floor must be detached and all systems need to be disconnected, including ductwork, electrical wiring, and piping. The baseboard, carpeting, tile, and sheet vinyl floor finishes in all rooms would be destroyed. It would be appropriate to salvage any historic flooring such as the wood flooring at the entry door.

The existing finish work on the wood walls would be removed at the base of the walls to enable the structure to be released from the existing foundation. At this time, the existing spacing and size of the wood wall framing members would be exposed for observation. The loading of the roof framing members is not being altered during the move or as a result of the proposed future occupancy. Therefore since no current structural damage is known to exist, it can safely be assumed that the roof members are adequate and do not need to be tested or verified unless modifications are proposed.

The brick block end walls need to be removed prior to any of the moving methods as these walls are not moveable. They would need to be taken down, the brick salvaged and moved separately and then the walls rebuilt at the new site. A new wood frame wall would need to be constructed at the master bedroom end of the house prior to the removal of the masonry wall. This new wall would provide the connection to the long walls and roof during moving.

Also, the garage would not be moved with the house. The masonry wall around the garage would be removed and the connection at the house wall would be severed. The garage roof would be removed and rebuilt on the new site. The frame wall between the garage and the house would serve as the end wall during moving. Furthermore, it must be noted that the built-up roofing system would most likely fail during the move. Cracks and detachment at the roof edges would occur, meaning the roof of each house would need to be replaced once each house is in position on its new foundation.

Moving Method One – Piercing the Walls with Steel Beams

This method is the most invasive method and would involve the most destruction to the historic houses. The steel beams would penetrate the walls - exterior and interior walls - in multiple places. Wood planks would then be lag bolted through the walls to the wood framing above the beams to provide bracing and support as the beams are lifted. All systems would be severed from the slab and all connections at the bottom plate of all walls would be severed. The ends of each beam exposed at the exterior of the house would then be slowly jacked up and the house lifted off the slab. The disadvantage to this method of moving each house is that it is very invasive. SHPO does not embrace this method as so much of the historic fabric, especially at the exterior, would be affected in the process. This method of moving each house would cost between \$15,000 and \$30,000.

Moving Method Two – Trenching and Beam Placement Beneath the House

This method would involve excavation around the house to provide room to insert the steel beams under the bottom plates of the wood frame walls. After trenching, the concrete stem walls would be punctured in eight to ten places along each long wall. At the interior, areas of the concrete floor would be removed across the width of the house in alignment with the eight to ten holes in the stem walls. Beams would be installed beneath the bottom plates of all walls. All systems would be severed from the slab and all connections at the bottom plate of all walls would be severed. The ends of the cross beams would then be slowly jacked up and the house lifted off the slab. Then the two, large, lengthwise beams would be installed under the cross beams and the total grid would be secured together. The entire grid of beams would be slowly jacked up and the house elevated for moving. This method is very labor intensive, requiring a large amount of excavation around each house and at the interior. The advantage is that there is greater security in this method as the entire grid and house are secured together. This method is less invasive to the historic fabric especially the exterior finishes. This method of moving each house would cost between \$25,000 and \$35,000.

Moving Method Three – Interior Beam Placement

This method involves placement of the steel beams in numerous places across the width of the house from the interior, then placing two larger beams lengthwise beneath the cross beams. This means maneuvering the eight to ten cross beams through the interior walls, puncturing partitions in multiple places. Again, wood planks would then be lag bolted through the walls to the wood framing above the beams to provide bracing and support as the beams are gradually lifted. All systems would be severed from the slab and all connections at the bottom plate of all walls would be severed. This method requires more jacks to be placed in many locations at the interior under the cross beams and carefully jacking them to gradually lift the structure. Then the two, large, lengthwise beams would be installed under the cross beams and the grid would be secured. The entire grid of beams would be slowly jacked up and the house elevated for moving. The security of the grid of beams and the house connection is not as dependable as Moving Method Two. Though the exterior fabric would be invaded less (bolt holes would occur), the interior would suffer more from the manipulation of beams at the interior, thus it would be more invasive. This method of moving each house would cost between \$35,000 and \$50,000.

Post-Move Considerations

Timeline – Once the structure has been moved to its new location, one of two construction timelines could take place. The first timeline involves immediate construction of the new foundation system and thus a relatively short time period when the house is suspended off the ground. This would be the ideal scenario to minimize potential damage to the structure.

The second possible timeline requires the structure to be lifted off the ground for an unlimited amount of time. This option would require significantly more bracing and shoring of the building members, especially members that were never designed to support any weight at all, including their own weight. This prolonged time line would require additional consideration of wind, snow, and gravity loads on all walls, beams, and joists whether or not they were previously categorized as structural or non-structural elements.

New Foundation – The proposed new foundation system would be a raised wood framed floor with concrete footings at the perimeter walls and at the interior bearing wall. The concrete and wood framed construction would start after the structure has been moved and is supported directly above the future foundation location.

Materials Testing – None of the existing materials require special testing or strength verification. The existing concrete foundation is being replaced, thus the strength and condition of the existing concrete is not applicable to the project. The existing exterior brick walls would be removed from the structure prior to the structures being moved, and they would be replaced, presumably, with structural wood walls, thus it is not critical that the existing masonry strength or steel reinforcement values be determined.

Rehabilitation for Public Use

Code Analysis – A code analysis was not conducted at this time as the specific layout and details of the new functions of each house is unknown. It is known that the occupancy use would change from residential to commercial and certain upgrades would be required for that transition to public use. Each house would need to be made handicap accessible: doorways would need to be made at least 36” in width, a handicap accessible restroom would be required, and one entrance to each building would need to be handicap accessible. Adequate parking would be required to accommodate automobiles based on the square footage of public use per building. A handicap accessible parking place must be designated.

Given the new public use, fire protection may be required. This would include the installation of a fire sprinkler system in each building. The location of nearby fire hydrants may be an issue and the need for additional hydrants would have to be determined.

Systems Upgrade – Mechanical, electrical, and communications systems would have to be upgraded per the commercial code. A new HVAC system, new plumbing, new wiring, and new cabling would need to be installed throughout each house. The salvaged plumbing fixtures may be reused, though a handicap accessible sink and toilet would be required per house.

Floor Systems – Discussion has occurred concerning the new floor system in the houses. When the garages are reconstructed, it is most likely that they would have slab-on-grade concrete floors again. It is not necessary to return to this floor system throughout the house. From the standpoint of moving the houses, it is easier to construct a wood frame floor system to accommodate the new mechanical and electrical systems within a crawl space. This would allow the houses to be lowered onto the wood floor system and the plumbing, ductwork, and wiring to occur after the walls are secured in place. This would entail a slightly higher concrete stem wall, as the houses would need to accommodate vents for air circulation at the crawl space. This means the concrete would be ten to twelve inches high at the exterior, whereas now only four to six inches of concrete is exposed.

Landscaping – Careful landscape design would be required for each building and include incorporation of parking lots, walkways, and vegetation. Establishing the “residential setting” around each building would, perhaps, be more of a challenge and the timeline for maturity would be lengthy. Recreating the full-grown landscape of the previous site, while accommodating multiple parking places, would also pose a difficult task depending on the new site selected.

APPENDIX D

RELOCATION AND REHABILITATION COSTS FOR ALTERNATIVES 1 AND 2

Senior Officers' Quarters MHAFB

Mountain Home, Idaho

Alternative 1 - Visitor Welcome Center at Front Gate

Costs associated with the pre-move demolition/move preparation, and post move rehabilitation of SOQ on a new foundation and the rehabilitation for use as a Visitor Welcome Center, including landscaping and parking.

	Total
Project Start-up/Clean-up	\$12,500
Excavation	\$9,270
Site Utilities	\$6,785
Site Work - grading, parking, walks	\$26,230
Landscaping	\$14,270
Demolition - Misc. Building - Pre-Move	\$15,750
Concrete	\$5,225
Masonry	\$12,490
Metals	\$1,715
Wood	\$18,680
Thermal & Moisture Protection	\$10,235
Doors and Windows	\$14,100
Interior Finishes	\$105,800
Welcome Visitor Center Furnishings/Displays	\$110,800
Mechanical	\$25,360
Electrical	\$20,035
SUB TOTAL	\$409,245
CONTINGENCY - 20%	\$81,850
SUB TOTAL	\$491,095
Moving expenses per house -	\$35,000 - \$50,000
Architectural & Engineering, Fees	\$59,520
<i>(Fees for Professional Services associated with the moving, relocating, and rehabilitation of one SOQ).</i>	
Complete HABS documentation	\$45,300
TOTAL RANGE including moving expenses and HABS Documentation	\$630,915 - \$645,915

Costs as per 2006, increase 3% per year

Senior Officers' Quarters MHAFB

Mountain Home, Idaho

Alternative 2 - Office and Laboratory Space at Heritage Park

Costs associated with the pre-move demolition/move preparation, and post move rehabilitation of SOQ on a new foundation and the rehabilitation for use as a Laboratory and Office, including landscaping and parking.

	Total
Project Start-up/Clean-up	\$12,500
Excavation	\$9,270
Site Utilities	\$6,785
Site Work - grading, parking, walks	\$26,230
Landscaping	\$14,270
Demolition - Misc. Building - Pre-Move	\$15,750
Concrete	\$5,225
Masonry	\$12,490
Metals	\$1,715
Wood	\$18,680
Thermal & Moisture Protection	\$10,235
Doors and Windows	\$14,100
Interior Finishes	\$105,800
Laboratory/Office Furnishings	\$75,850
Mechanical	\$25,360
Electrical	\$20,035
SUB TOTAL	\$374,295
CONTINGENCY - 20%	\$74,860
SUB TOTAL	\$449,155
Moving expenses per house -	\$35,000 - \$50,000
Architectural & Engineering, Fees	\$54,900
<i>(Fees for Professional Services associated with the moving, relocating, and rehabilitation of one SOQ).</i>	
Complete HABS documentation	\$45,300
TOTAL RANGE including moving expenses and HABS Documentation	\$584,355 - \$599,355

Costs as per 2006, increase 3% per year